Client:	Anchor QEA	**Date:**	September 23, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-1427 - 1446
Revised on:		**Date sampled:**	7-7-21 & 7-8-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: August 23, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1427	LDW21-GT10-GB-0-1.5 ft	233.1	600.7	434.9	165.8	201.8	82.2%
B21-1428	LDW21-GT10-GB-0-9 ft	233.1	804.9	583.3	221.6	350.2	63.3%
B21-1429	LDW21-GT10-GB-9-14 ft	221.7	1019.4	669.5	349.9	447.8	78.1%
B21-1430	LDW21-GT10-GB-14-19 ft	224.1	475.2	368.0	107.2	143.9	74.5%
B21-1431	LDW21-GT10-GB-19-24 ft	217.2	895.4	719.1	176.3	501.9	35.1%
B21-1432	LDW21-GT10-GB-24-25.5 ft	233.7	639.9	567.2	72.7	333.5	21.8%
B21-1433	LDW21-GT28-GB-0-1.5 ft	208.6	1012.3	678.5	333.8	469.9	71.0%
B21-1434	LDW21-GT28-GB-0-10 ft	222.9	1087.3	729.8	357.5	506.9	70.5%
B21-1435	LDW21-GT28-GB-10-11.5 ft	302.0	1045.9	721.9	324.0	419.9	77.2%
B21-1436	LDW21-GT28-GB-10-15 ft	303.4	1236.5	827.0	409.5	523.6	78.2%
B21-1437	LDW21-GT28-GB-15-16.8 ft	311.0	880.9	647.2	233.7	336.2	69.5%
B21-1438	LDW21-GT28-GB-16.8-20 ft	223.0	1069.1	875.2	193.9	652.2	29.7%
B21-1439	LDW21-GT28-GB-20-21.5 ft	221.8	951.4	801.9	149.5	580.1	25.8%
B21-1440	LDW21-GT21-GB-0-1.5 ft	222.7	653.9	446.8	207.1	224.1	92.4%
B21-1441	LDW21-GT21-GB-0-13 ft	234.6	1463.8	860.0	603.8	625.4	96.5%
B21-1442	LDW21-GT21-GB-13-16 ft	225.2	1059.7	808.7	251.0	583.5	43.0%
B21-1443	LDW21-GT21-GB-16-17.5 ft	233.1	805.2	661.3	143.9	428.2	33.6%
B21-1444	LDW21-GT21-GB-16-21 ft	215.7	1239.6	953.1	286.5	737.4	38.9%
B21-1445	LDW21-GT21-GB-21-25.7 ft	225.1	772.5	628.4	144.1	403.3	35.7%
B21-1446	LDW21-GT21-GB-26-31 ft	108.4	1248.4	956.1	292.3	847.7	34.5%

Reviewed by: 

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: August 25, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-1428	LDW21-GT10-GB-0-9 ft	584.04	660.85	76.8	TSA-011	190.3	499.5	0.99754	734.30	688.64	23.0	2.465721	0.99933	2.464069
B21-1431	LDW21-GT10-GB-19-24 ft	501.90	602.67	100.8	TSA-021	183.4	499.4	0.99754	742.98	681.60	23.0	2.5581693	0.99933	2.5564553
B21-1442	LDW21-GT21-GB-13-16 ft	510.13	611.47	101.3	TSA-020	195.0	499.5	0.99754	755.39	693.29	23.0	2.5824927	0.99933	2.5807624
B21-1445	LDW21-GT21-GB-21-25.7 ft	500.61	577.32	76.7	TSA-022	198.0	499.5	0.99754	742.91	696.21	23.0	2.5560327	0.99933	2.5543202

Reviewed by: Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	23-Aug-21
Source:	LDW21-GT10-GB-0-9 ft	**Tested By:**	A. Eifrig
Sample #:	B21-1428		

Visual Identification
Silt with Clay
Sample Color
brown

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Liquid limit cannot be established					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

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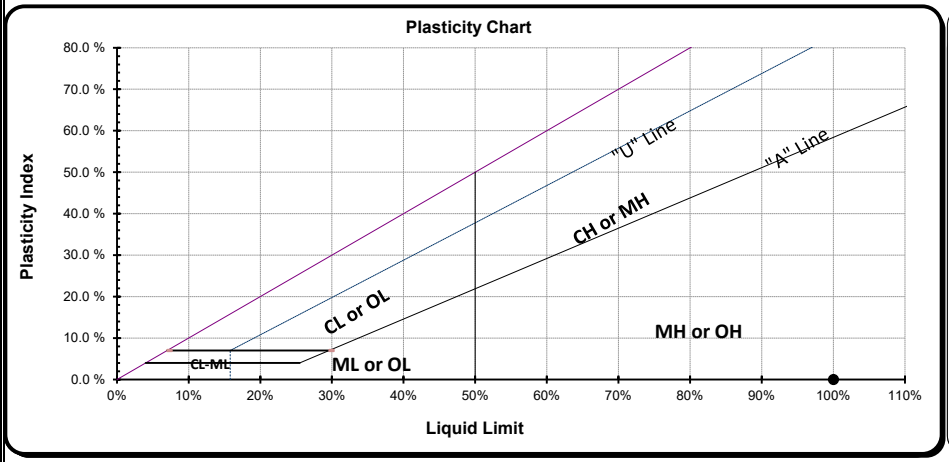
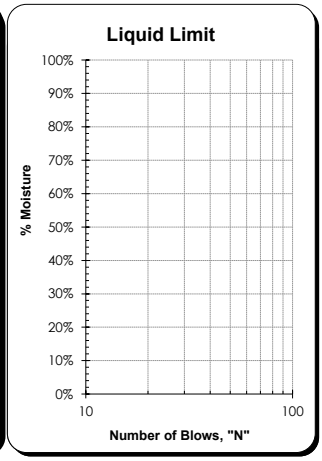
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	23-Aug-21
Source:	LDW21-GT10-GB-9-14 ft	**Tested By:**	A. Eifrig
Sample #:	B21-1429		

Visual Identification
Silt with Clay
Sample Color
brown

Liquid Limit Determination

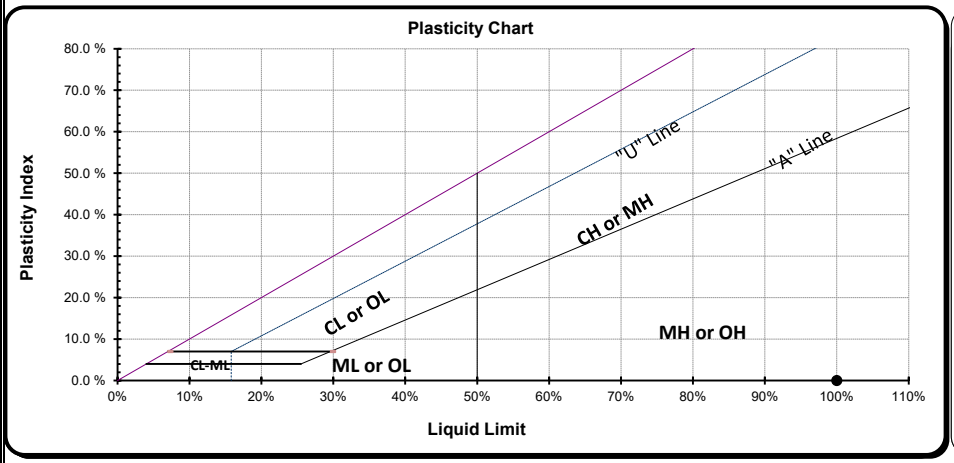
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	40.29	42.71	29.23			
Weight of Dry Soils + Pan:	37.17	38.71	25.20			
Weight of Pan:	28.61	28.25	15.04			
Weight of Dry Soils:	8.56	10.46	10.16			
Weight of Moisture:	3.12	4.00	4.03			
% Moisture:	36.5 %	38.2 %	39.7 %			
Number of Blows:	27	16	11			

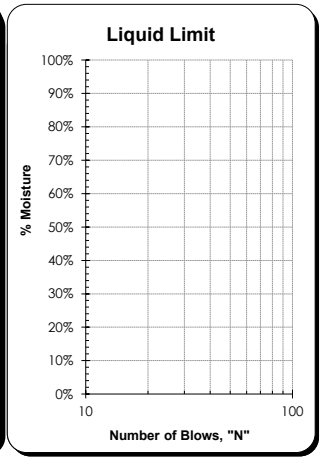
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: 37 %
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT10-GB-14-19 ft
Sample#: B21-1430

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 23-Aug-21
Tested By: A. Eifrig

Visual Identification
Clayey Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

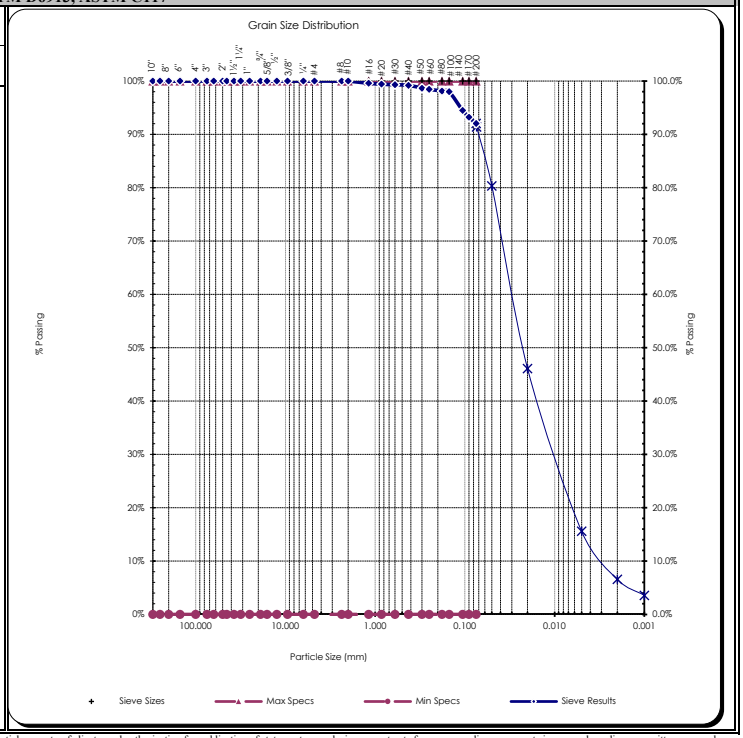
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.001	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 0.79
$D_{(10)}$ =	0.003	mm	% Sand =	8.0%	Coeff. of Uniformity, C_U = 9.14
$D_{(15)}$ =	0.005	mm	% Silt & Clay =	92.0%	Fineness Modulus = 0.04
$D_{(30)}$ =	0.009	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.024	mm	Plasticity Index =	n/a	Moisture %, as sampled = 74.5%
$D_{(60)}$ =	0.031	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.072	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	90/97		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50		100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		99%	100.0%	0.0%
#60	0.250		98%	100.0%	0.0%
#80	0.180		98%	100.0%	0.0%
#100	0.150	98%	98%	100.0%	0.0%
#140	0.106		95%	100.0%	0.0%
#170	0.090		93%	100.0%	0.0%
#200	0.075	92.0%	92.0%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	23-Aug-21
Source:	LDW21-GT10-GB-14-19 ft	**Tested By:**	A. Eifrig
Sample#:	B21-1430		

Visual Identification
Clayey Silt
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	50.30	grams
Hydroscopic Moist.:	3.78%	
Adj. Sample Wgt :	48.47	grams

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Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	35	72.2%	0.0444 mm
2	30.5	62.9%	0.0326 mm
4	24.5	50.5%	0.0240 mm
15	18.5	38.2%	0.0129 mm
30	15	30.9%	0.0093 mm
60	10.5	21.7%	0.0068 mm
240	5	10.3%	0.0035 mm
1440	2.5	5.2%	0.0014 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	8.0%	**Plastic Limit:**	n/a
% Silt:	76.4%	**Plasticity Index:**	n/a
% Clay:	15.6%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	99%	0.850 mm
#40	99%	0.425 mm
#100	98%	0.150 mm
#200	92.0%	0.075 mm
Silts	91.4%	0.074 mm
	80.4%	0.050 mm
	46.1%	0.020 mm
Clays	15.6%	0.005 mm
	6.6%	0.002 mm
Colloids	3.6%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Silt Loam

Comments:

Reviewed by: Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

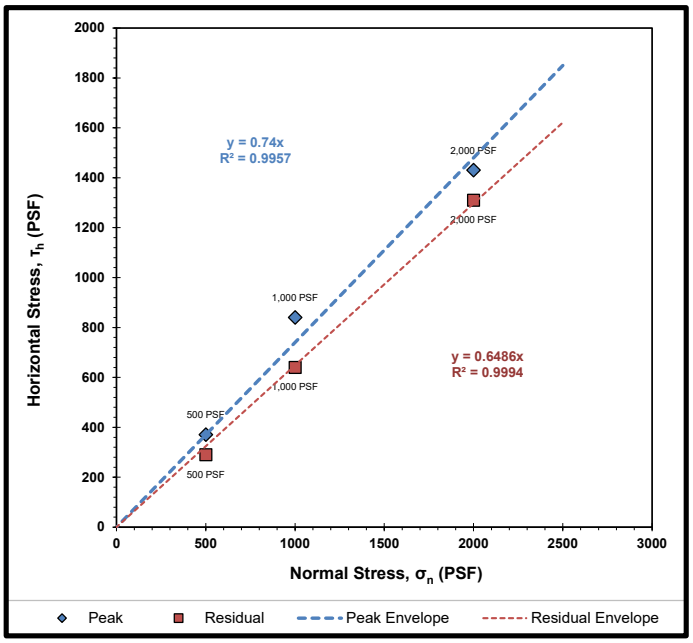
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT10-GB-14-19 ft
Laboratory Sample ID:	B21-1430	**Visual Soil Description:**	brown clayey silt
Sample Date:	7/7/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/20/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0042
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	45.3	
	Initial	**Post-Consolidation**
Dry Density (PCF):	91.7	95.2
Void Ratio:	0.837	0.770
Porosity (%):	45.6	43.5
Degree of Saturation (%):	saturated	saturated

Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	40.4	
	Initial	**Post-Consolidation**
Dry Density (PCF):	95.4	102.4
Void Ratio:	0.765	0.646
Porosity (%):	43.4	39.3
Degree of Saturation (%):	saturated	saturated

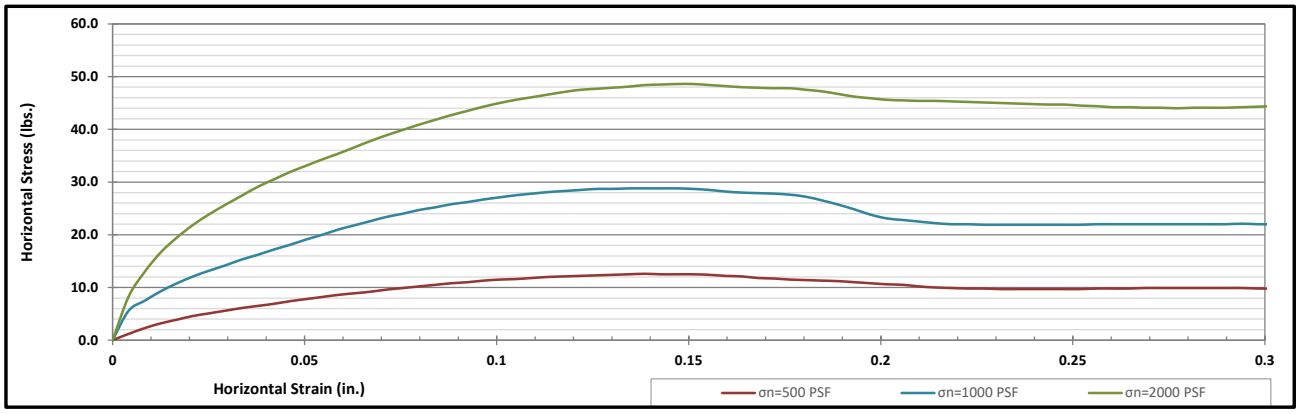
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	37.0	
	Initial	**Post-Consolidation**
Dry Density (PCF):	97.7	106.6
Void Ratio:	0.725	0.581
Porosity (%):	42.0	36.7
Degree of Saturation (%):	saturated	saturated

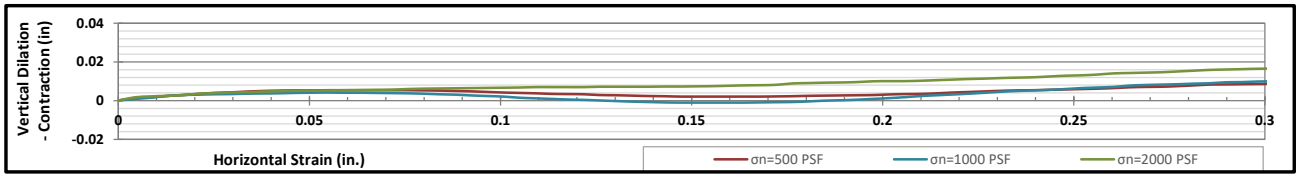


ESTIMATED STRENGTH PARAMETERS

	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**37**	**33**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	370	840	1430
Residual Horizontal Stress, τ_h (PSF):	290	640	1310





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Visit our website: www.mtc-inc.net

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT10-GB-19-24 ft
Sample#: B21-1431

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 23-Aug-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color:
grayish-brown

ACCREDITED
Certificate #: 1366.01

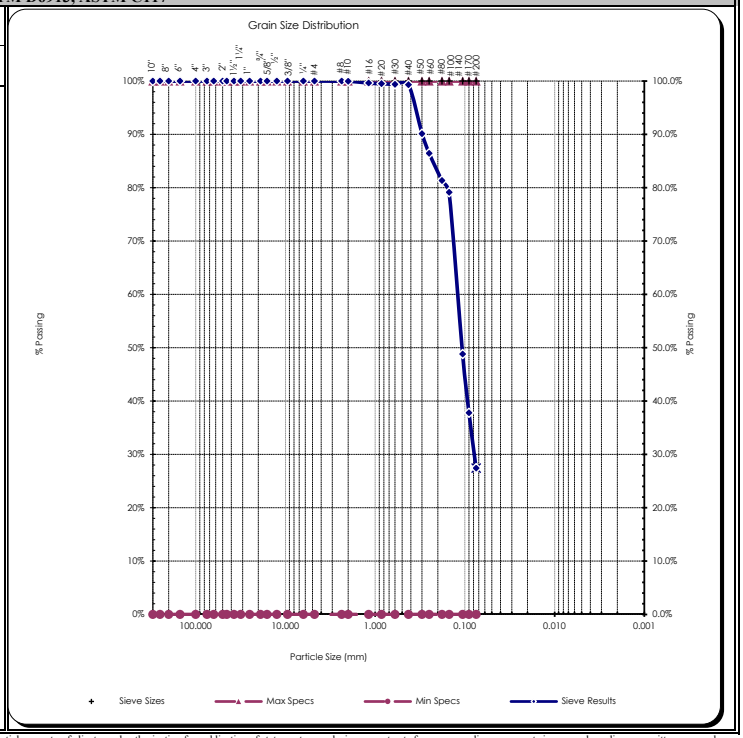
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.014	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.85
$D_{(10)}$ =	0.027	mm	% Sand =	72.5%	Coeff. of Uniformity, C_U = 4.47
$D_{(15)}$ =	0.041	mm	% Silt & Clay =	27.5%	Fineness Modulus = 0.32
$D_{(30)}$ =	0.079	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.108	mm	Plasticity Index =	n/a	Moisture %, as sampled = 35.1%
$D_{(60)}$ =	0.122	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.298	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	13/47		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		90%	100.0%	0.0%
#60	0.250		86%	100.0%	0.0%
#80	0.180		81%	100.0%	0.0%
#100	0.150	79%	79%	100.0%	0.0%
#140	0.106		49%	100.0%	0.0%
#170	0.090		38%	100.0%	0.0%
#200	0.075	27.5%	27.5%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	25-Aug-21
Source:	LDW21-GT28-GB-0-10 ft	**Tested By:**	A. Eifrig
Sample #:	B21-1434		

Visual Identification
Clay with Silt
Sample Color
dark brown

Liquid Limit Determination

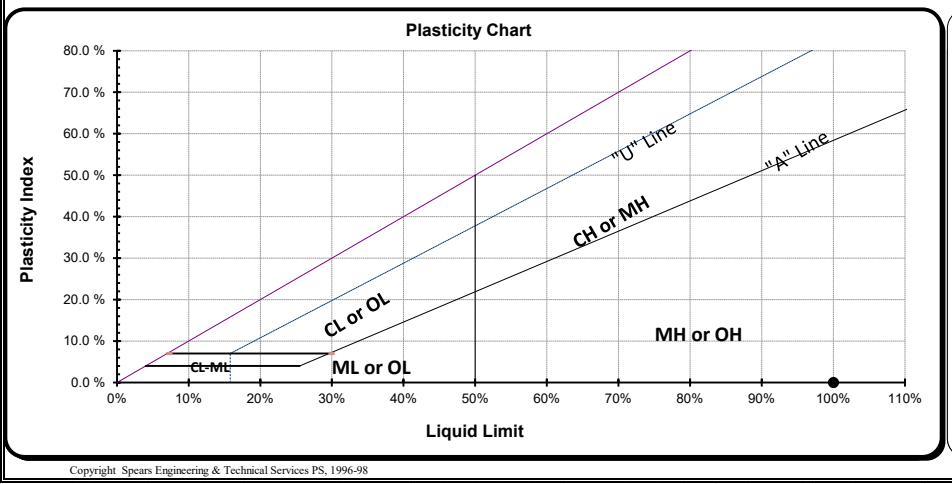
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	33.52	24.84	28.54			
Weight of Dry Soils + Pan:	28.91	21.54	25.61			
Weight of Pan:	19.45	14.96	19.90			
Weight of Dry Soils:	9.46	6.58	5.71			
Weight of Moisture:	4.61	3.30	2.93			
% Moisture:	48.7 %	50.2 %	51.3 %			
Number of Blows:	34	22	19			

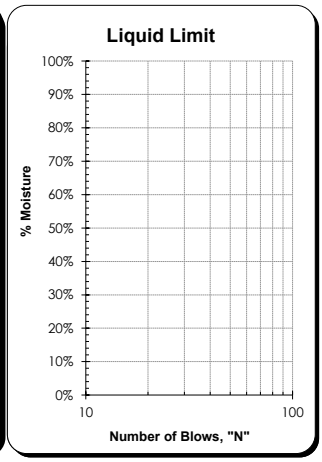
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: 50 %
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Plastic Limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	25-Aug-21
Source:	LDW21-GT28-GB-10-15 ft	**Tested By:**	A. Eifrig
Sample #:	B21-1436		

Visual Identification
Silty Clay
Sample Color
dark brown

Liquid Limit Determination

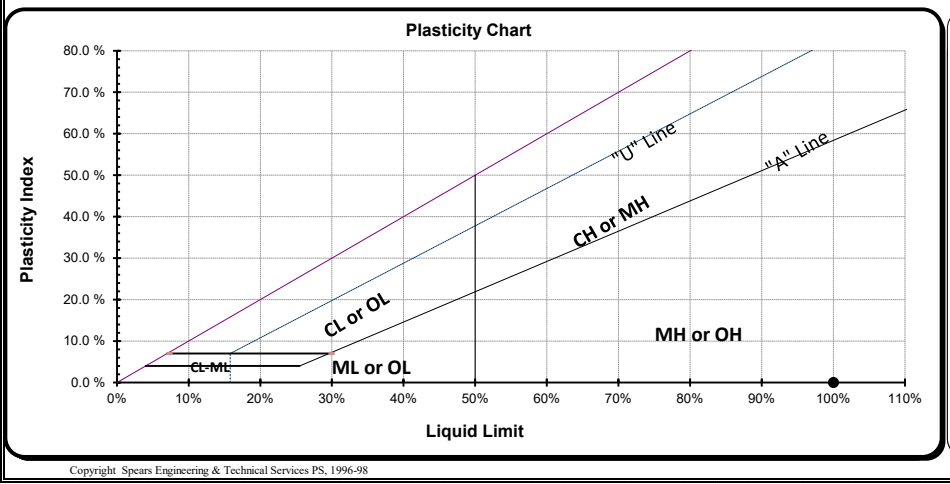
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	30.19	31.68	32.21			
Weight of Dry Soils + Pan:	26.52	27.44	27.75			
Weight of Pan:	19.62	19.54	19.84			
Weight of Dry Soils:	6.90	7.90	7.91			
Weight of Moisture:	3.67	4.24	4.46			
% Moisture:	53.2 %	53.7 %	56.4 %			
Number of Blows:	25	21	12			

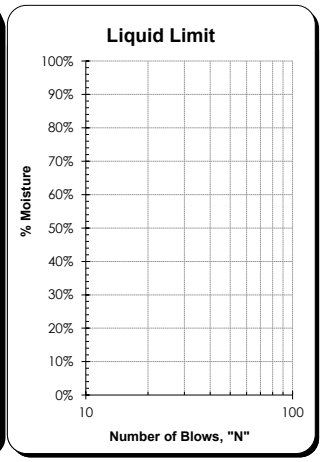
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: 53 %
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Plastic Limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:
Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	25-Aug-21
Source:	LDW21-GT28-GB-15-16.8 ft	**Tested By:**	A. Eifrig
Sample #:	B21-1437		

Visual Identification
Clay and Silt
Sample Color
dark brown

Liquid Limit Determination

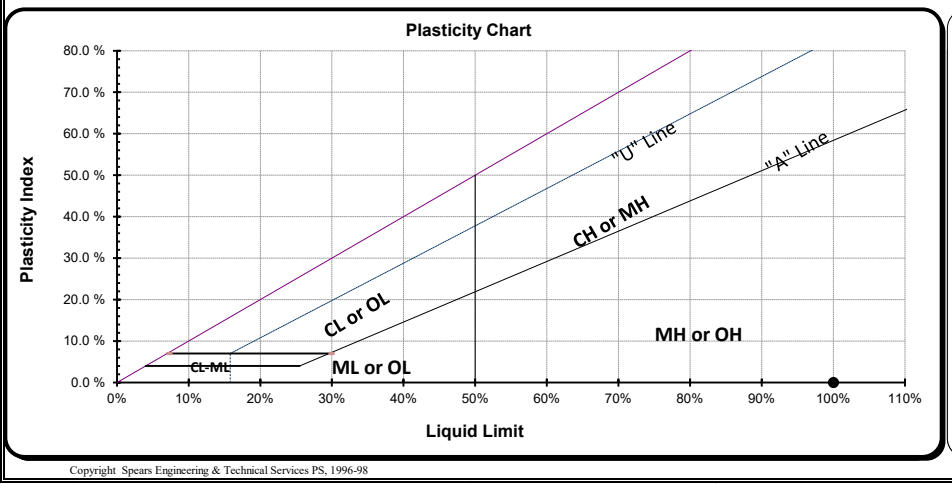
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	31.73	40.08	39.56			
Weight of Dry Soils + Pan:	28.13	36.32	36.04			
Weight of Pan:	19.86	28.17	28.53			
Weight of Dry Soils:	8.27	8.15	7.51			
Weight of Moisture:	3.60	3.76	3.52			
% Moisture:	43.5 %	46.1 %	46.9 %			
Number of Blows:	27	15	12			

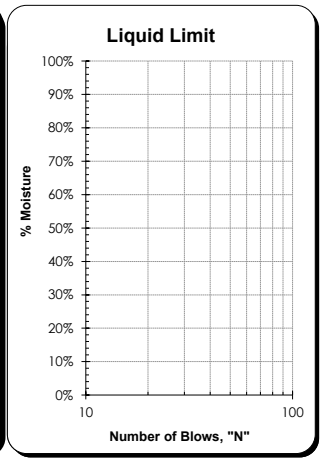
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: 44 %
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Plastic Limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT28-GB-16.8-20 ft
Sample#: B21-1438

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 23-Aug-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SP, Poorly graded Sand
Sample Color:
gray

ACCREDITED
Certificate #: 1366.01

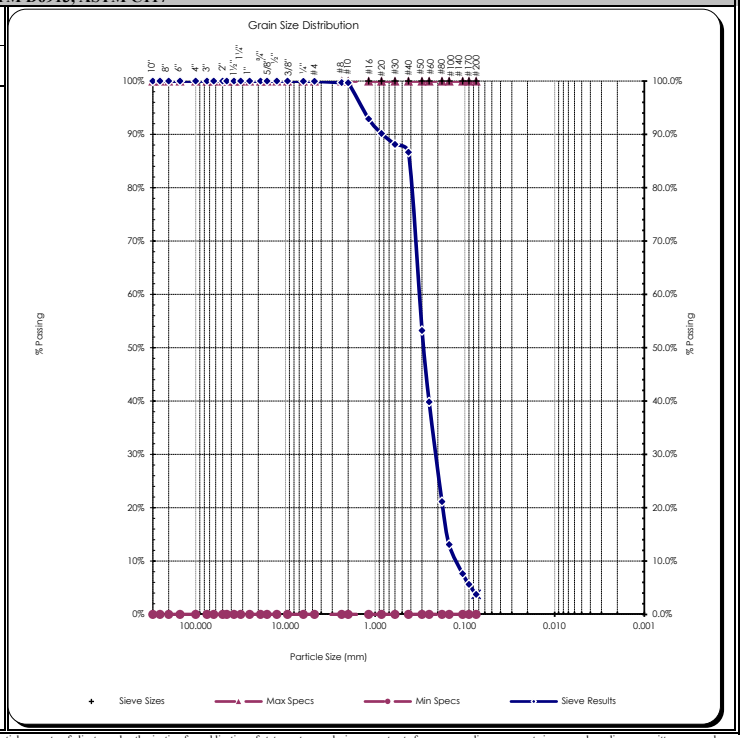
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.085	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.12
$D_{(10)}$ =	0.125	mm	% Sand =	96.2%	Coeff. of Uniformity, C_U = 2.60
$D_{(15)}$ =	0.157	mm	% Silt & Clay =	3.8%	Fineness Modulus = 1.53
$D_{(30)}$ =	0.213	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.288	mm	Plasticity Index =	n/a	Moisture %, as sampled = 29.7%
$D_{(60)}$ =	0.325	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.827	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	1/23		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		93%	100.0%	0.0%
#20	0.850		90%	100.0%	0.0%
#30	0.600		88%	100.0%	0.0%
#40	0.425	87%	87%	100.0%	0.0%
#50	0.300		53%	100.0%	0.0%
#60	0.250		40%	100.0%	0.0%
#80	0.180		21%	100.0%	0.0%
#100	0.150	13%	13%	100.0%	0.0%
#140	0.106		8%	100.0%	0.0%
#170	0.090		6%	100.0%	0.0%
#200	0.075	3.8%	3.8%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

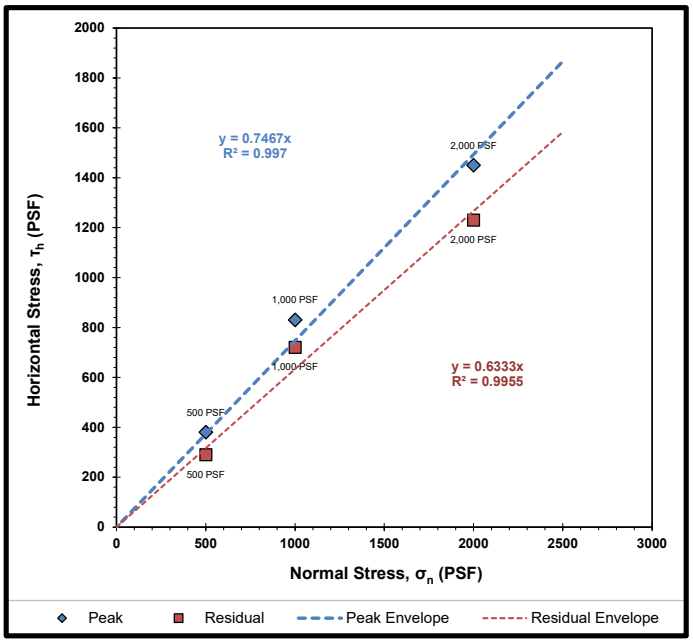
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT28-GB-16.8-20 ft
Laboratory Sample ID:	B21-1438	**Visual Soil Description:**	gray sand
Sample Date:	7/7/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	8/25/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	31.3	
	Initial	**Post-Consolidation**
Dry Density (PCF):	105.4	106.7
Void Ratio:	0.598	0.579
Porosity (%):	37.4	36.7
Degree of Saturation (%):	saturated	saturated

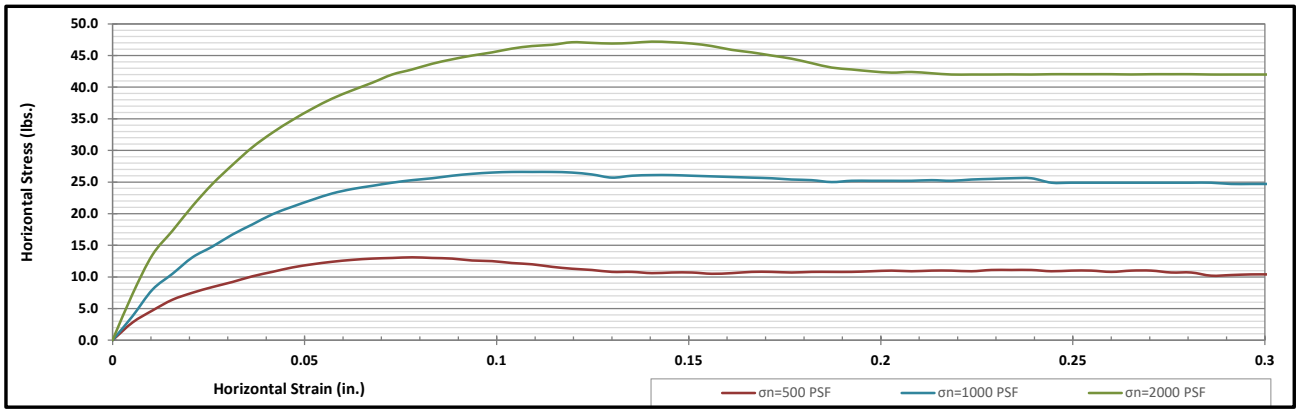
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	31.0	
	Initial	**Post-Consolidation**
Dry Density (PCF):	105.6	107.2
Void Ratio:	0.595	0.572
Porosity (%):	37.3	36.4
Degree of Saturation (%):	saturated	saturated

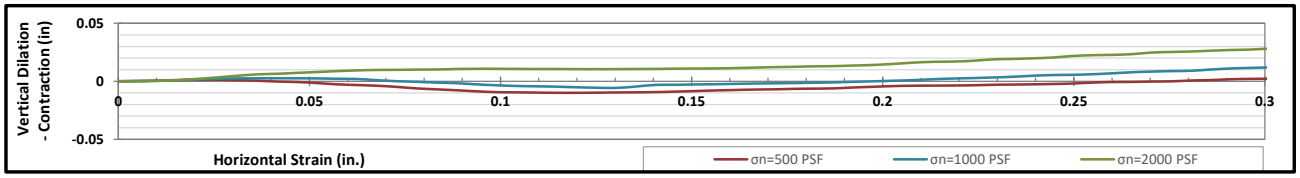
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	32.9	
	Initial	**Post-Consolidation**
Dry Density (PCF):	104.0	107.8
Void Ratio:	0.619	0.562
Porosity (%):	38.2	36.0
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**37**	**32**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	380	830	1450
Residual Horizontal Stress, τ_h (PSF):	290	720	1230





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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	25-Aug-21
Source:	LDW21-GT21-GB-0-13 ft	**Tested By:**	A. Eifrig
Sample #:	B21-1441		

Visual Identification
Silty Clay
Sample Color
dark brown

Liquid Limit Determination

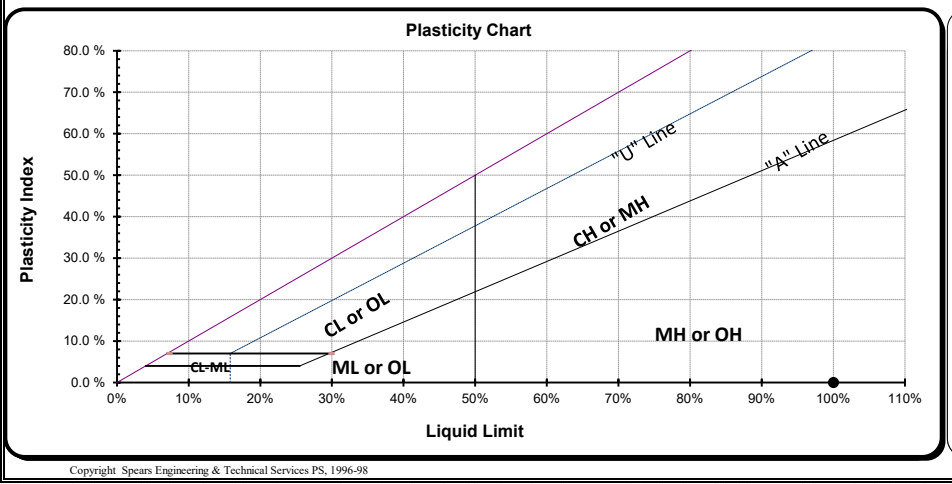
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	28.39	31.98	25.34			
Weight of Dry Soils + Pan:	23.97	27.63	21.68			
Weight of Pan:	15.01	19.45	14.80			
Weight of Dry Soils:	8.96	8.18	6.88			
Weight of Moisture:	4.42	4.35	3.66			
% Moisture:	49.3 %	53.2 %	53.2 %			
Number of Blows:	35	17	19			

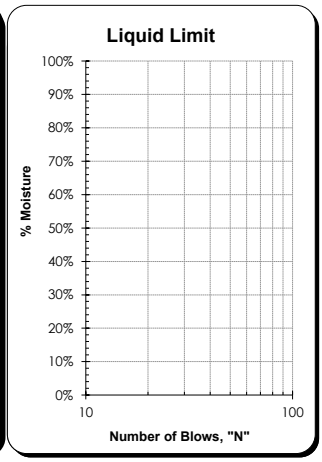
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: 52 %
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Plastic Limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT21-GB-13-16 ft
Sample#: B21-1442

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 23-Aug-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

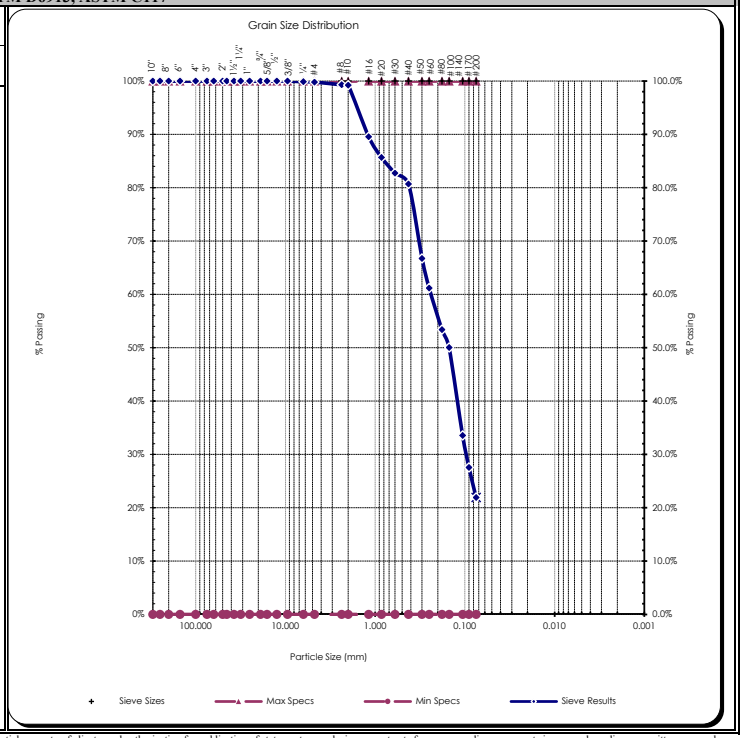
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.017	mm	% Gravel =	0.2%	Coeff. of Curvature, C_C = 1.14
$D_{(10)}$ =	0.034	mm	% Sand =	77.9%	Coeff. of Uniformity, C_U = 7.00
$D_{(15)}$ =	0.051	mm	% Silt & Clay =	22.0%	Fineness Modulus = 1.12
$D_{(30)}$ =	0.096	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.150	mm	Plasticity Index =	n/a	Moisture %, as sampled = 96.5%
$D_{(60)}$ =	0.239	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.216	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	3/11		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		90%	100.0%	0.0%
#20	0.850		86%	100.0%	0.0%
#30	0.600		83%	100.0%	0.0%
#40	0.425	81%	81%	100.0%	0.0%
#50	0.300		67%	100.0%	0.0%
#60	0.250		61%	100.0%	0.0%
#80	0.180		53%	100.0%	0.0%
#100	0.150	50%	50%	100.0%	0.0%
#140	0.106		34%	100.0%	0.0%
#170	0.090		28%	100.0%	0.0%
#200	0.075	22.0%	22.0%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT21-GB-16-21 ft
Sample#: B21-1444

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 23-Aug-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color:
dark gray

ACCREDITED
Certificate #: 1366.01

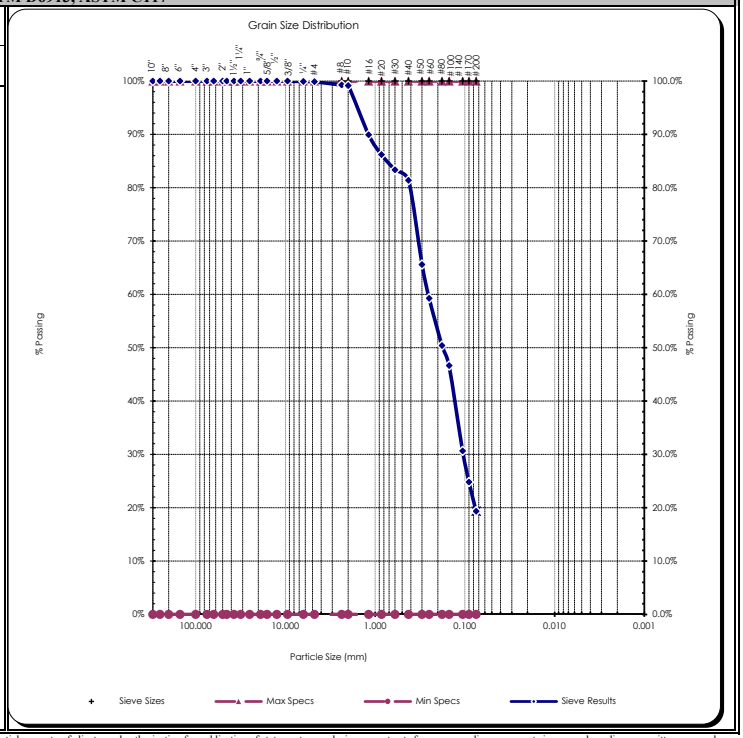
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.019	mm	% Gravel =	0.1%	Coeff. of Curvature, C_C = 1.10
$D_{(10)}$ =	0.039	mm	% Sand =	80.5%	Coeff. of Uniformity, C_U = 6.61
$D_{(15)}$ =	0.058	mm	% Silt & Clay =	19.4%	Fineness Modulus = 1.15
$D_{(30)}$ =	0.104	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.177	mm	Plasticity Index =	n/a	Moisture %, as sampled = 38.7%
$D_{(60)}$ =	0.256	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.188	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	5/21		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		90%	100.0%	0.0%
#20	0.850		86%	100.0%	0.0%
#30	0.600		83%	100.0%	0.0%
#40	0.425	81%	81%	100.0%	0.0%
#50	0.300		66%	100.0%	0.0%
#60	0.250		59%	100.0%	0.0%
#80	0.180		50%	100.0%	0.0%
#100	0.150	47%	47%	100.0%	0.0%
#140	0.106		31%	100.0%	0.0%
#170	0.090		25%	100.0%	0.0%
#200	0.075	19.4%	19.4%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

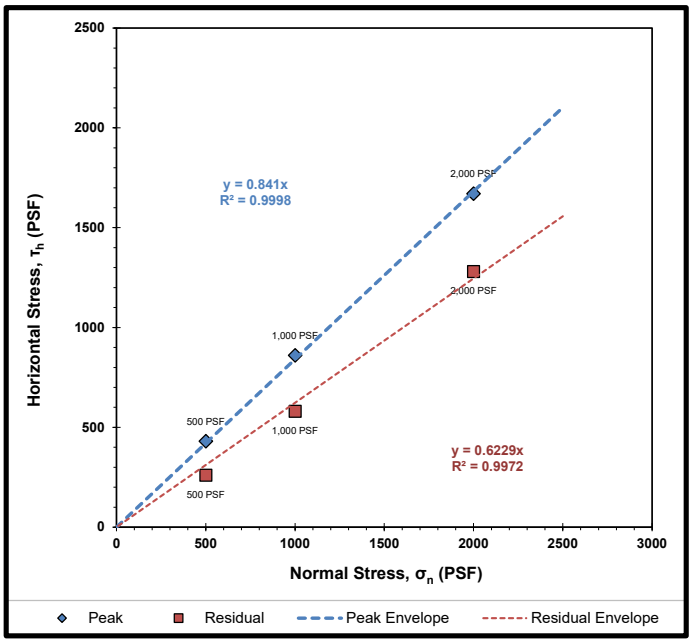
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT21-GB-16-21 ft
Laboratory Sample ID:	B21-1444	**Visual Soil Description:**	dark gray sand
Sample Date:	7/8/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/13/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	26.8	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.5	109.1
Void Ratio:	0.568	0.545
Porosity (%):	36.2	35.3
Degree of Saturation (%):	saturated	saturated

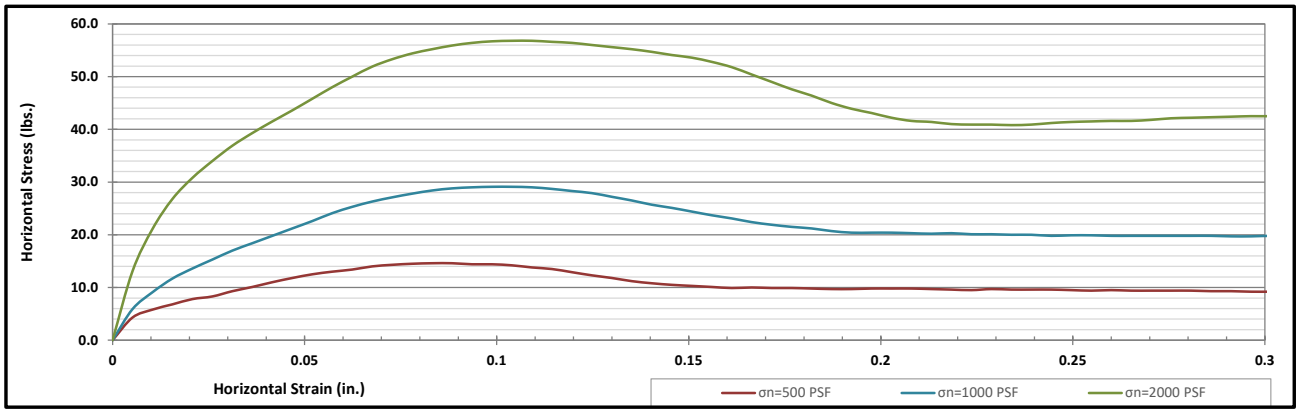
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	26.2	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.6	110.8
Void Ratio:	0.566	0.521
Porosity (%):	36.1	34.3
Degree of Saturation (%):	saturated	saturated

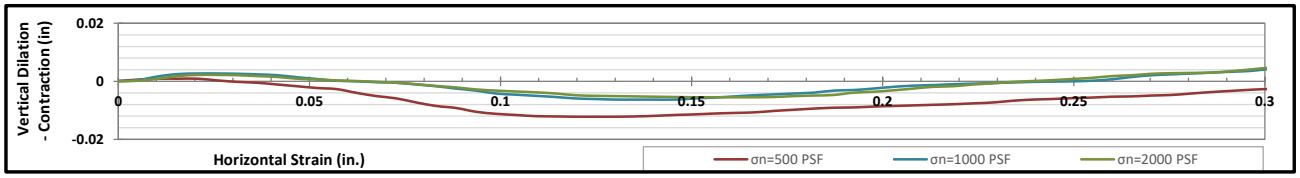
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	24.9	
	Initial	**Post-Consolidation**
Dry Density (PCF):	108.8	113.7
Void Ratio:	0.549	0.481
Porosity (%):	35.4	32.5
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**40**	**32**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	430	860	1670
Residual Horizontal Stress, τ_h (PSF):	260	580	1280





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NW Region • 805 Dupont, Suite #5 • Bellingham, WA 98225 • Phone 360.647.6061 • Fax 360.647.8111
Kitsap Region • 5451 N.W. Newberry Hill Road, Suite 101 • Silverdale, WA 98383 • Phone/Fax 360.698.6787

Visit our website: www.mtc-inc.net

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT21-GB-21-25.7 ft
Sample#: B21-1445

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 23-Aug-21
Tested By: A. Eifrig

Visual Identification
Sandy Silt
Sample Color:
grayish-brown

ACCREDITED
Certificate #: 1366.01

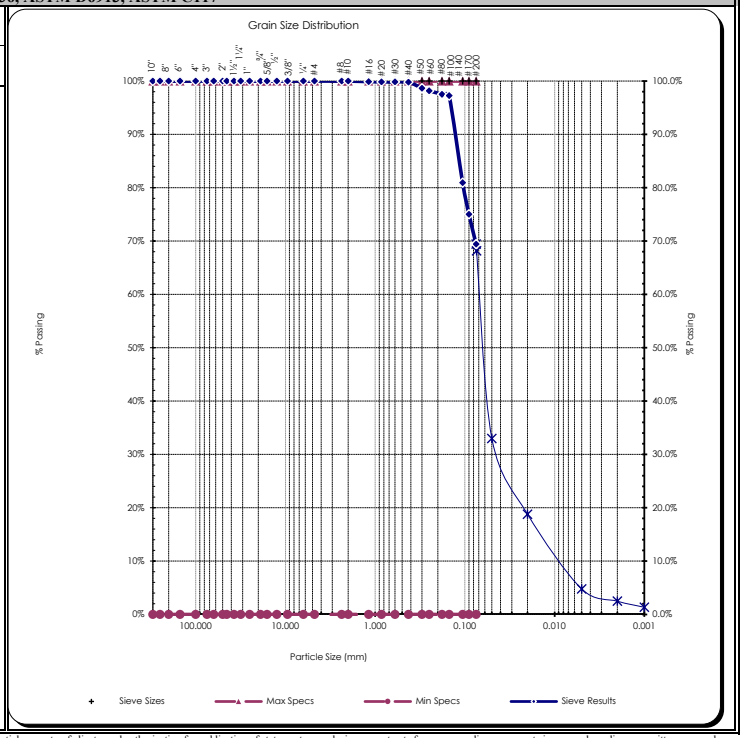
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.005	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 2.30
$D_{(10)}$ =	0.010	mm	% Sand =	30.5%	Coeff. of Uniformity, C_U = 6.70
$D_{(15)}$ =	0.015	mm	% Silt & Clay =	69.5%	Fineness Modulus = 0.04
$D_{(30)}$ =	0.040	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.060	mm	Plasticity Index =	n/a	Moisture %, as sampled = 35.7%
$D_{(60)}$ =	0.068	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.130	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	16/23		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50		100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850		100%	100.0%	0.0%
#30	0.600		100%	100.0%	0.0%
#40	0.425	100%	100%	100.0%	0.0%
#50	0.300		99%	100.0%	0.0%
#60	0.250		98%	100.0%	0.0%
#80	0.180		98%	100.0%	0.0%
#100	0.150	97%	97%	100.0%	0.0%
#140	0.106		81%	100.0%	0.0%
#170	0.090		75%	100.0%	0.0%
#200	0.075	69.5%	69.5%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	23-Aug-21
Source:	LDW21-GT21-GB-21-25.7 ft	**Tested By:**	A. Eifrig
Sample#:	B21-1445		

Visual Identification
Sandy Silt
Sample Color
grayish-brown

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr :	2.55	
Sample Weight:	51.07	grams
Hydroscopic Moist.:	0.72%	
Adj. Sample Wgt :	50.70	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	19.5	39.2%	0.0512 mm
2	14	28.2%	0.0373 mm
4	12	24.1%	0.0266 mm
15	7	14.1%	0.0142 mm
30	5	10.1%	0.0101 mm
60	3	6.0%	0.0072 mm
240	2	4.0%	0.0036 mm
1440	1	2.0%	0.0015 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	30.5%	**Plastic Limit:**	n/a
% Silt:	64.7%	**Plasticity Index:**	n/a
% Clay:	4.8%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	100%	0.850 mm
#40	100%	0.425 mm
#100	97%	0.150 mm
#200	69.5%	0.075 mm
Silts	68.2%	0.074 mm
	33.0%	0.050 mm
	18.8%	0.020 mm
Clays	4.8%	0.005 mm
	2.5%	0.002 mm
Colloids	1.4%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sandy Loam

Comments:

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT21-GB-26-31 ft
Sample#: B21-1446

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 23-Aug-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color:
gray

ACCREDITED
Certificate #: 1366.01

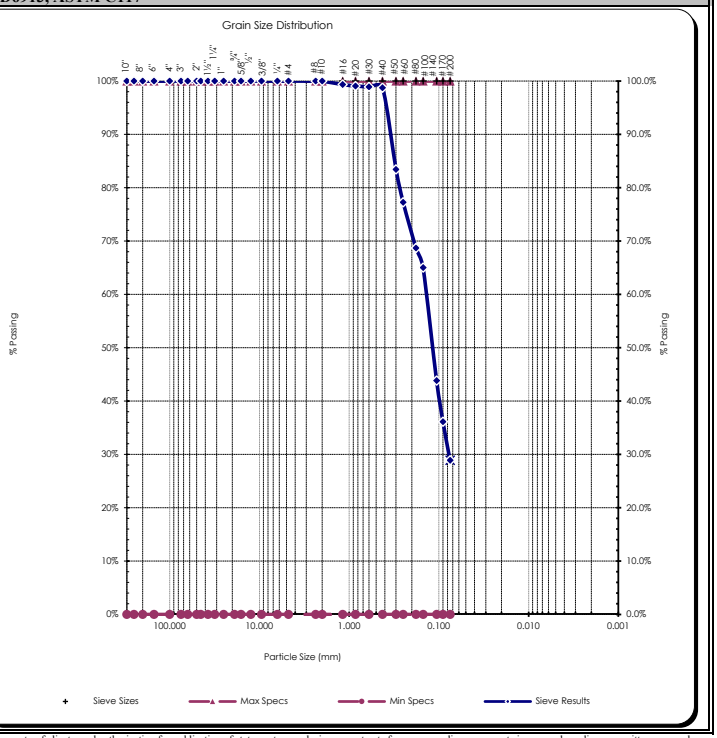
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.013	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.65
$D_{(10)}$ =	0.026	mm	% Sand =	71.1%	Coeff. of Uniformity, C_U = 5.38
$D_{(15)}$ =	0.039	mm	% Silt & Clay =	28.9%	Fineness Modulus = 0.53
$D_{(30)}$ =	0.077	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.119	mm	Plasticity Index =	n/a	Moisture %, as sampled = 34.2%
$D_{(60)}$ =	0.140	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.354	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	12/41		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		83%	100.0%	0.0%
#60	0.250		77%	100.0%	0.0%
#80	0.180		69%	100.0%	0.0%
#100	0.150	65%	65%	100.0%	0.0%
#140	0.106		44%	100.0%	0.0%
#170	0.090		36%	100.0%	0.0%
#200	0.075	28.9%	28.9%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Client:	Anchor QEA	**Date:**	September 28, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-1321 - 1335
Revised on:		**Date sampled:**	7-26-21 & 7-27-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Date Received: July 29, 2021
Date Tested: August 24, 2021

Client: Anchor QEA
Sampled by: Client
Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1321	LDW21-GT24-0-5 ft	233.2	648.4	595.4	53.0	362.2	14.6%
B21-1322	LDW21-GT24-5-13.6ft	234.1	1046.2	877.7	168.5	643.6	26.2%
B21-1323	LDW21-GT24-13.6-29 ft	232.6	1197.1	1046.9	150.2	814.3	18.4%
B21-1324	LDW21-GT24-33-35 ft	229.5	540.4	454.5	85.9	225.0	38.2%
B21-1325	LDW21-GT24-35-43 ft	233.3	1203.4	995.3	208.1	762.0	27.3%
B21-1326	LDW21-GT24-43-50 ft	223.9	840.4	682.9	157.5	459.0	34.3%
B21-1327	LDW21-GT24-53.3-59 ft	234.6	1087.0	874.9	212.1	640.3	33.1%
B21-1328	LDW21-GT36-0-3.6 ft	215.2	760.8	729.9	30.9	514.7	6.0%
B21-1329	LDW21-GT36-3.6-6.2 ft	217.1	499.1	461.2	37.9	244.1	15.5%
B21-1330	LDW21-GT36-6.2-9.5 ft	91.9	740.7	600.6	140.1	508.7	27.5%
B21-1331	LDW21-GT36-9.5-11.7 ft	221.2	864.4	682.7	181.7	461.5	39.4%
B21-1332	LDW21-GT36-11.7-32 ft	215.5	1106.1	985.3	120.8	769.8	15.7%
B21-1333	LDW21-GT36-32-34.7 ft	223.9	674.7	563.9	110.8	340.0	32.6%
B21-1334	LDW21-GT36-34.7-50 ft	759.4	1828.1	1623.0	205.1	863.6	23.7%
B21-1335	LDW21-GT36-50.5-61.5 ft	233.5	678.3	545.8	132.5	312.3	42.4%

Reviewed by: Meghan Blodgett-Carrillo

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: August 26, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-1323	LDW21-GT24-13.6-29 ft	601.52	701.51	100.0	TSA-010	180.3	499.5	0.99754	742.00	678.62	23.0	2.7311347	0.99933	2.7293049
B21-1326	LDW21-GT24-43-50 ft	497.42	571.51	74.1	TSA-017	187.9	499.4	0.99754	731.68	686.06	23.0	2.6022626	0.99933	2.600519
B21-1332	LDW21-GT36-11.7-32 ft	497.79	598.00	100.2	TSA-015	187.6	499.5	0.99754	748.84	685.87	23.0	2.6908295	0.99933	2.6890267
B21-1335	LDW21-GT36-50.5-61.5 ft	600.15	650.57	50.4	TSA-016	197.2	499.5	0.99754	726.46	695.45	23.0	2.5974523	0.99933	2.595712

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW-GT24-5-13.6 ft
Sample#: B21-1322

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 24-Aug-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

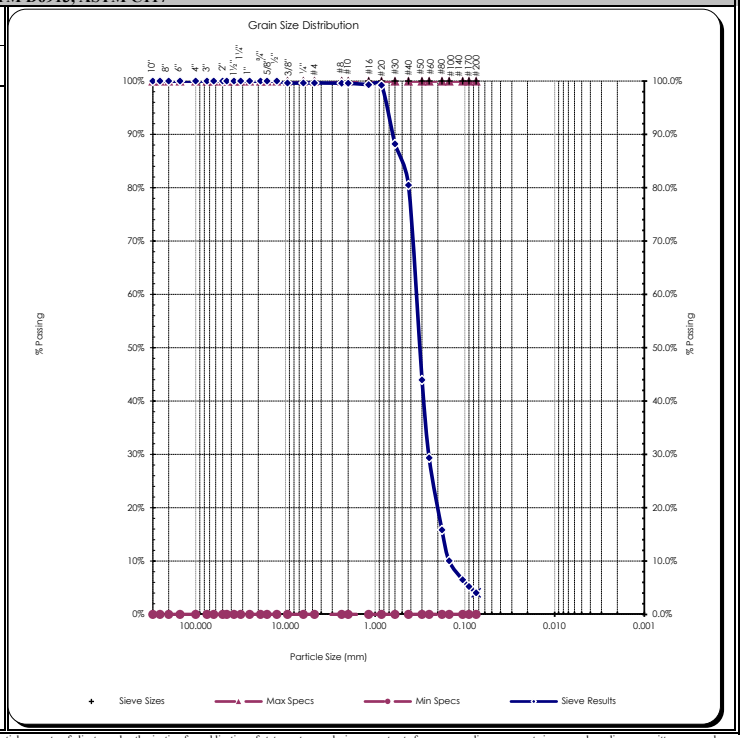
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.087	mm	% Gravel =	0.4%	Coeff. of Curvature, C_C = 1.20
$D_{(10)}$ =	0.149	mm	% Sand =	95.6%	Coeff. of Uniformity, C_U = 2.38
$D_{(15)}$ =	0.176	mm	% Silt & Clay =	4.0%	Fineness Modulus = 1.60
$D_{(30)}$ =	0.252	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.321	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 26.2%
$D_{(60)}$ =	0.355	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.640	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	1/20		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850	99%	99%	100.0%	0.0%
#30	0.600		88%	100.0%	0.0%
#40	0.425	81%	81%	100.0%	0.0%
#50	0.300		44%	100.0%	0.0%
#60	0.250	29%	29%	100.0%	0.0%
#80	0.180		16%	100.0%	0.0%
#100	0.150	10%	10%	100.0%	0.0%
#140	0.106		7%	100.0%	0.0%
#170	0.090		5%	100.0%	0.0%
#200	0.075	4.0%	4.0%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

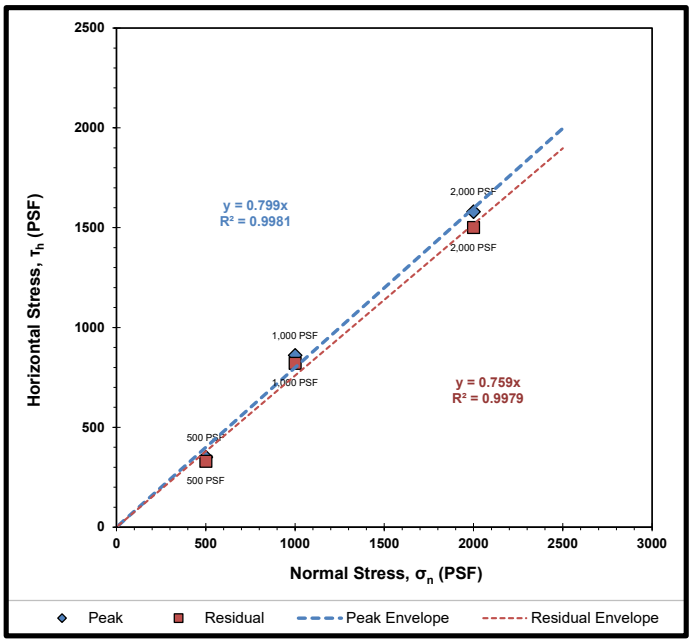
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW-GT24-5-13.6 ft
Laboratory Sample ID:	B21-1322	**Visual Soil Description:**	brown sand with silt
Sample Date:	7/26/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	8/24/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	26.4	
	Initial	**Post-Consolidation**
Dry Density (PCF):	108.1	108.3
Void Ratio:	0.559	0.556
Porosity (%):	35.9	35.7
Degree of Saturation (%):	saturated	saturated

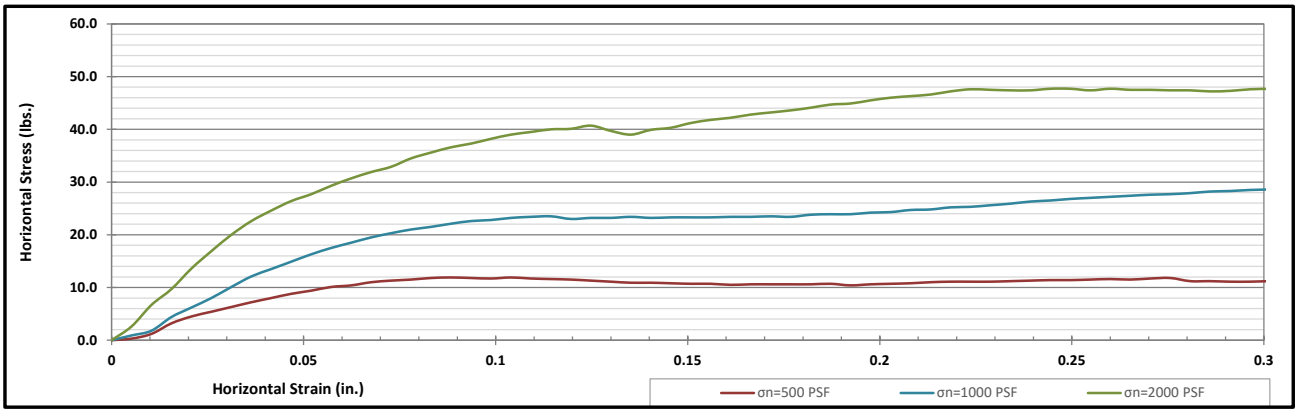
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	27.1	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.4	109.3
Void Ratio:	0.569	0.541
Porosity (%):	36.3	35.1
Degree of Saturation (%):	saturated	saturated

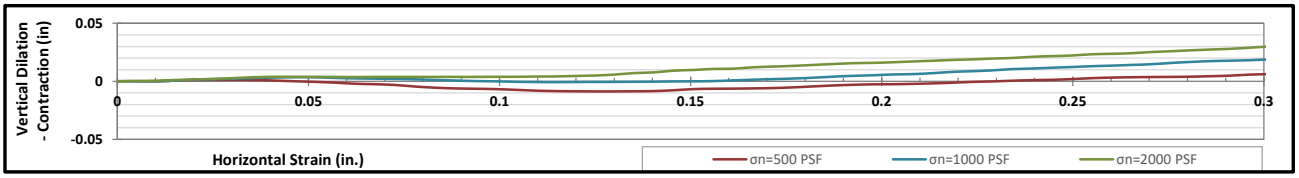
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	29.0	
	Initial	**Post-Consolidation**
Dry Density (PCF):	105.6	108.6
Void Ratio:	0.595	0.551
Porosity (%):	37.3	35.5
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**39**	**37**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	350	860	1580
Residual Horizontal Stress, τ_h (PSF):	330	820	1500





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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW-GT24-13.6-29 ft
Sample#: B21-1323

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 24-Aug-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

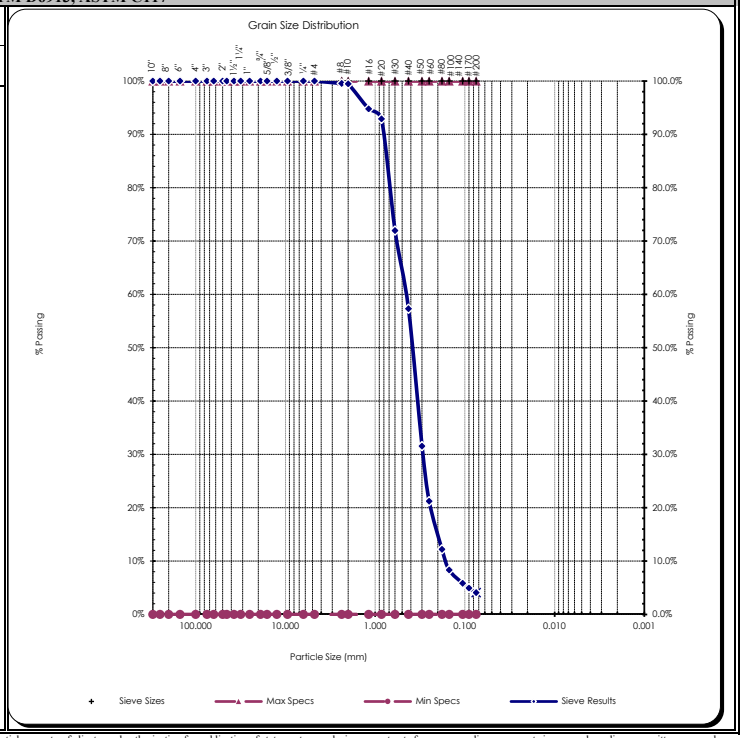
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.091	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.15
$D_{(10)}$ =	0.163	mm	% Sand =	95.9%	Coeff. of Uniformity, C_U = 2.81
$D_{(15)}$ =	0.201	mm	% Silt & Clay =	4.1%	Fineness Modulus = 1.94
$D_{(30)}$ =	0.292	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.389	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 18.4%
$D_{(60)}$ =	0.457	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.815	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	1/14		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		95%	100.0%	0.0%
#20	0.850	93%	93%	100.0%	0.0%
#30	0.600		72%	100.0%	0.0%
#40	0.425	57%	57%	100.0%	0.0%
#50	0.300		32%	100.0%	0.0%
#60	0.250	21%	21%	100.0%	0.0%
#80	0.180		12%	100.0%	0.0%
#100	0.150	8%	8%	100.0%	0.0%
#140	0.106		6%	100.0%	0.0%
#170	0.090		5%	100.0%	0.0%
#200	0.075	4.1%	4.1%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

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Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	25-Aug-21
Source:	LDW-GT24-33-35 ft	**Tested By:**	C. Kriss
Sample #:	B21-1324		

Visual Identification
Sandy Silt
Sample Color
brown

Liquid Limit Determination

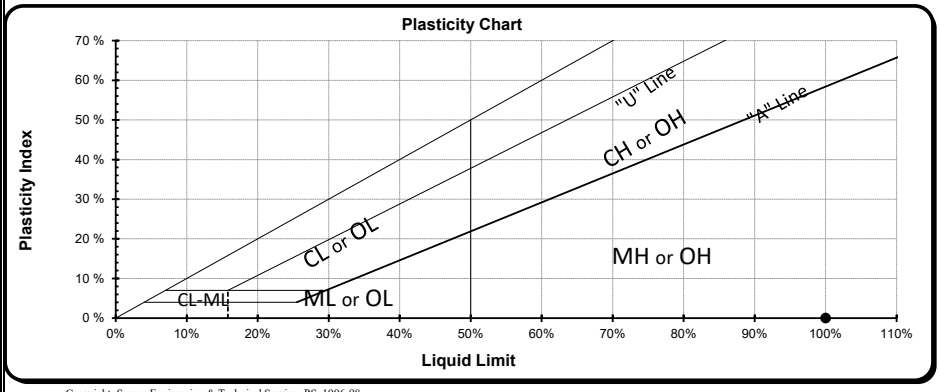
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Liquid Limit cannot be established					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

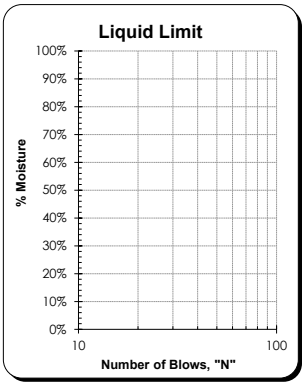
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic Limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW-GT24-35-43 ft
Sample#: B21-1325

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 24-Aug-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
gray

ACCREDITED
Certificate #: 1366.01

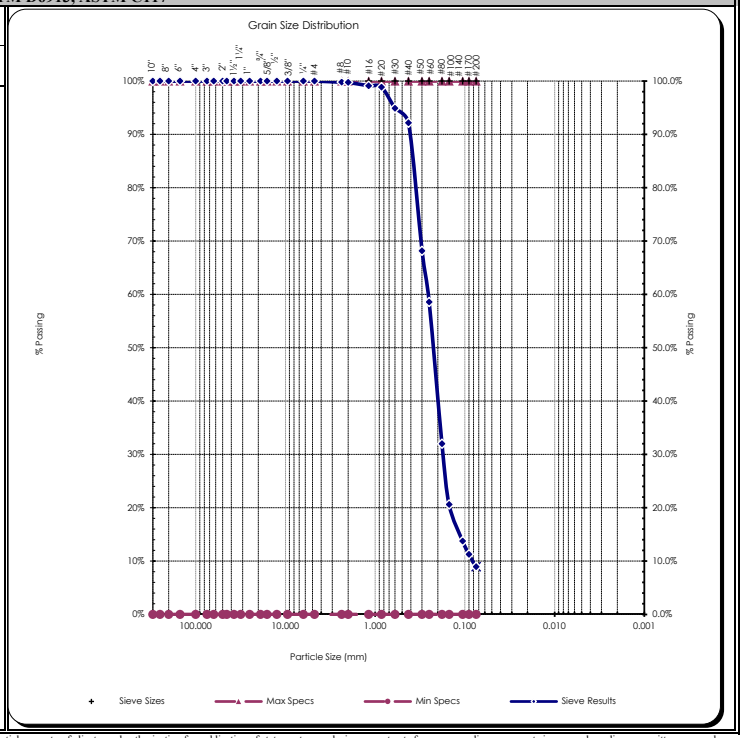
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.042	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C =	1.45
$D_{(10)}$ =	0.082	mm	% Sand =	91.1%	Coeff. of Uniformity, C_U =	3.14
$D_{(15)}$ =	0.114	mm	% Silt & Clay =	8.9%	Fineness Modulus =	1.17
$D_{(30)}$ =	0.175	mm	Liquid Limit =	0.0%	Plastic Limit =	0.0%
$D_{(50)}$ =	0.227	mm	Plasticity Index =	0.0%	Moisture %, as sampled =	27.3%
$D_{(60)}$ =	0.257	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	0.414	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	3/31		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850	99%	99%	100.0%	0.0%
#30	0.600		95%	100.0%	0.0%
#40	0.425	92%	92%	100.0%	0.0%
#50	0.300		68%	100.0%	0.0%
#60	0.250	59%	59%	100.0%	0.0%
#80	0.180		32%	100.0%	0.0%
#100	0.150	21%	21%	100.0%	0.0%
#140	0.106		14%	100.0%	0.0%
#170	0.090		11%	100.0%	0.0%
#200	0.075	8.9%	8.9%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	25-Aug-21
Source:	LDW-GT24-43-50 ft	**Tested By:**	C. Kriss
Sample #:	B21-1326		

Visual Identification
Silty Sand
Sample Color
dark brown

Liquid Limit Determination

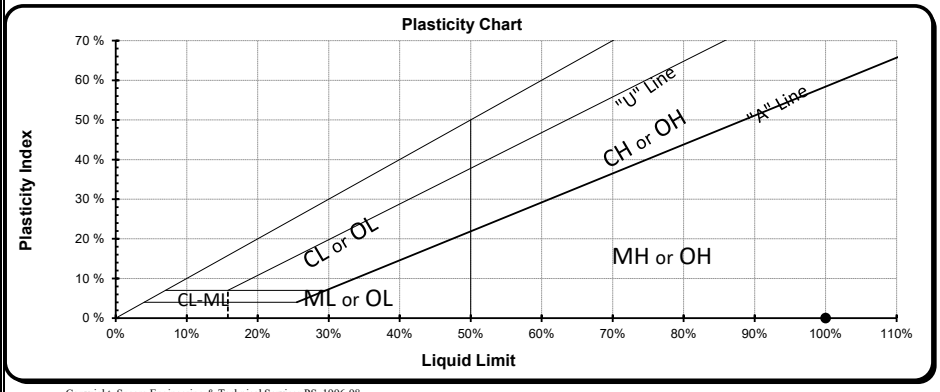
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Liquid Limit cannot be established				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

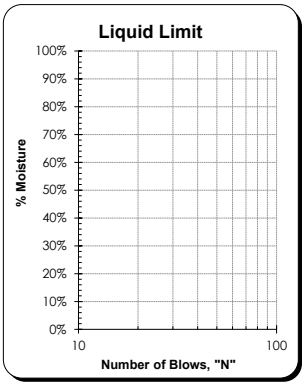
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Plastic Limit cannot be determined				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW-GT24-53.3-59 ft
Sample#: B21-1327

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 24-Aug-21
Tested By: A. Eifrig

Visual Identification
Sandy Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

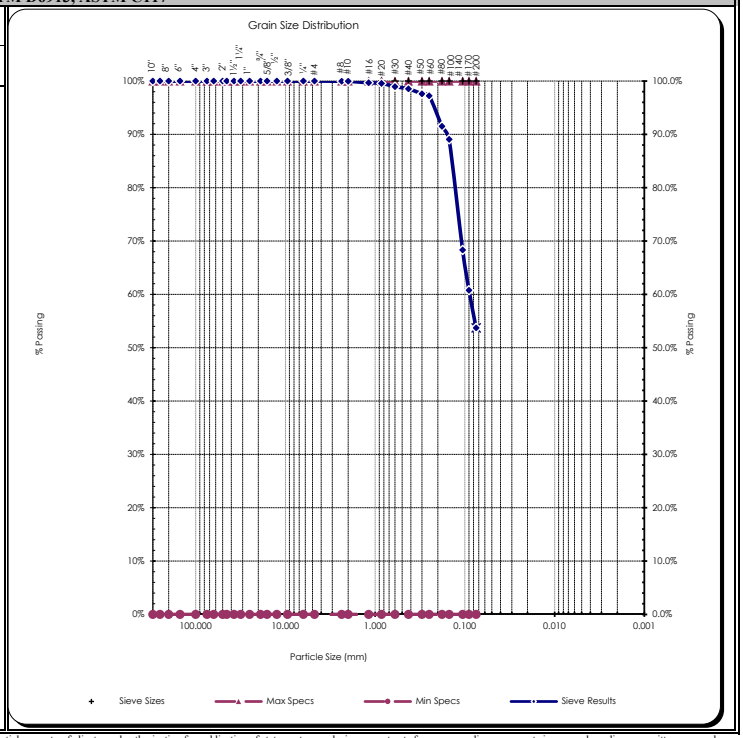
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.007	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.42
$D_{(10)}$ =	0.014	mm	% Sand =	46.3%	Coeff. of Uniformity, C_U = 6.33
$D_{(15)}$ =	0.021	mm	% Silt & Clay =	53.7%	Fineness Modulus = 0.15
$D_{(30)}$ =	0.042	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.070	mm	Plasticity Index =	n/a	Moisture %, as sampled = 33.1%
$D_{(60)}$ =	0.088	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.161	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	6/11		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850	100%	100%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		98%	100.0%	0.0%
#60	0.250	97%	97%	100.0%	0.0%
#80	0.180		92%	100.0%	0.0%
#100	0.150	89%	89%	100.0%	0.0%
#140	0.106		68%	100.0%	0.0%
#170	0.090		61%	100.0%	0.0%
#200	0.075	53.7%	53.7%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW-GT36-3.6-6.2 ft
Sample#: B21-1329

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 24-Aug-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

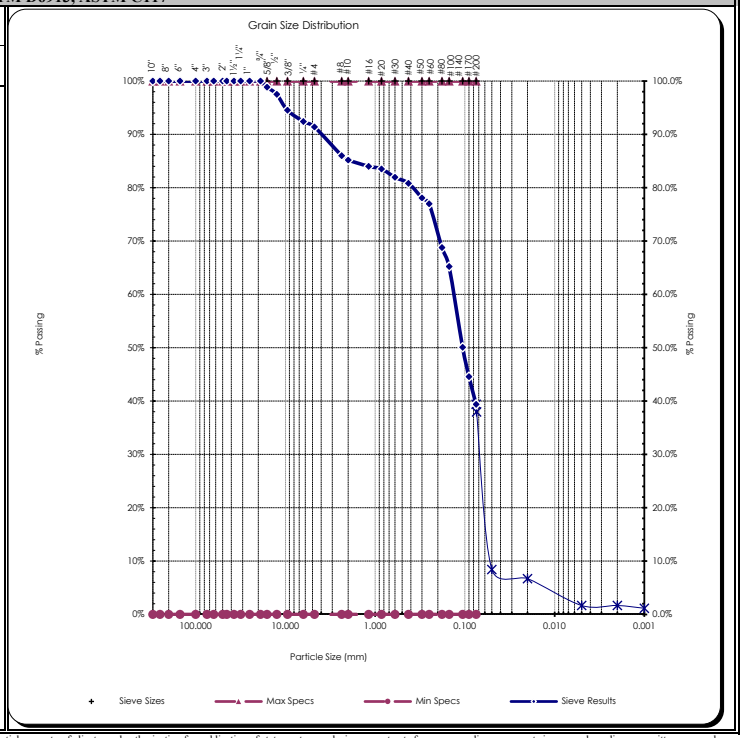
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.016	mm	% Gravel =	8.6%	Coeff. of Curvature, C_C = 0.64
$D_{(10)}$ =	0.055	mm	% Sand =	52.0%	Coeff. of Uniformity, C_U = 2.46
$D_{(15)}$ =	0.058	mm	% Silt & Clay =	39.4%	Fineness Modulus = 1.19
$D_{(30)}$ =	0.069	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.106	mm	Plasticity Index =	n/a	Moisture %, as sampled = 15.5%
$D_{(60)}$ =	0.135	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	4.129	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	39/80		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		99%	100.0%	0.0%
1/2"	12.50	98%	98%	100.0%	0.0%
3/8"	9.50	95%	95%	100.0%	0.0%
1/4"	6.30		92%	100.0%	0.0%
#4	4.75	91%	91%	100.0%	0.0%
#8	2.36		86%	100.0%	0.0%
#10	2.00	85%	85%	100.0%	0.0%
#16	1.18		84%	100.0%	0.0%
#20	0.850	84%	84%	100.0%	0.0%
#30	0.600		82%	100.0%	0.0%
#40	0.425	81%	81%	100.0%	0.0%
#50	0.300		78%	100.0%	0.0%
#60	0.250	77%	77%	100.0%	0.0%
#80	0.180		69%	100.0%	0.0%
#100	0.150	65%	65%	100.0%	0.0%
#140	0.106		50%	100.0%	0.0%
#170	0.090		45%	100.0%	0.0%
#200	0.075	39.4%	39.4%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	24-Aug-21
Source:	LDW-GT36-3.6-6.2 ft	**Tested By:**	A. Eifrig
Sample#:	B21-1329		

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	50.78	grams
Hydroscopic Moist.:	0.57%	
Adj. Sample Wgt :	50.49	grams

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Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	5	8.4%	0.0537 mm
2	5	8.4%	0.0380 mm
5	5	8.4%	0.0240 mm
15	2.5	4.2%	0.0141 mm
30	1	1.7%	0.0100 mm
60	1	1.7%	0.0071 mm
240	1	1.7%	0.0035 mm
1440	1	1.7%	0.0014 mm

% Gravel:	8.6%	**Liquid Limit:**	n/a
% Sand:	52.0%	**Plastic Limit:**	n/a
% Silt:	37.7%	**Plasticity Index:**	n/a
% Clay:	1.7%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	99%	16.000 mm
1/2"	98%	12.500 mm
3/8"	95%	9.500 mm
1/4"	92%	6.300 mm
#4	91%	4.750 mm
#10	85%	2.000 mm
#20	84%	0.850 mm
#40	81%	0.425 mm
#100	65%	0.150 mm
#200	39.4%	0.075 mm
Silts	38.0%	0.074 mm
	8.4%	0.050 mm
	6.7%	0.020 mm
Clays	1.7%	0.005 mm
	1.7%	0.002 mm
Colloids	1.2%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sand

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

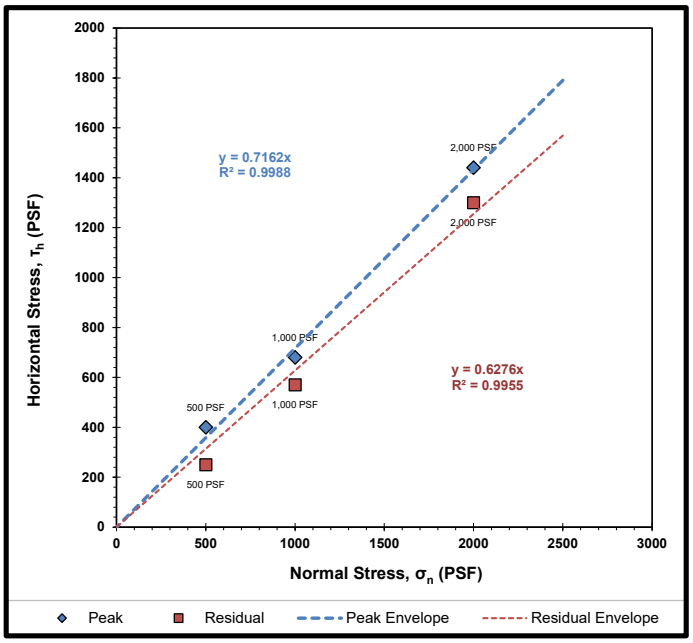
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW-GT36-3.6-6.2 ft
Laboratory Sample ID:	B21-1329	**Visual Soil Description:**	brown silty sand
Sample Date:	7/26/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	8/26/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	19.8	
	Initial	**Post-Consolidation**
Dry Density (PCF):	114.5	115.4
Void Ratio:	0.472	0.460
Porosity (%):	32.1	31.5
Degree of Saturation (%):	saturated	saturated

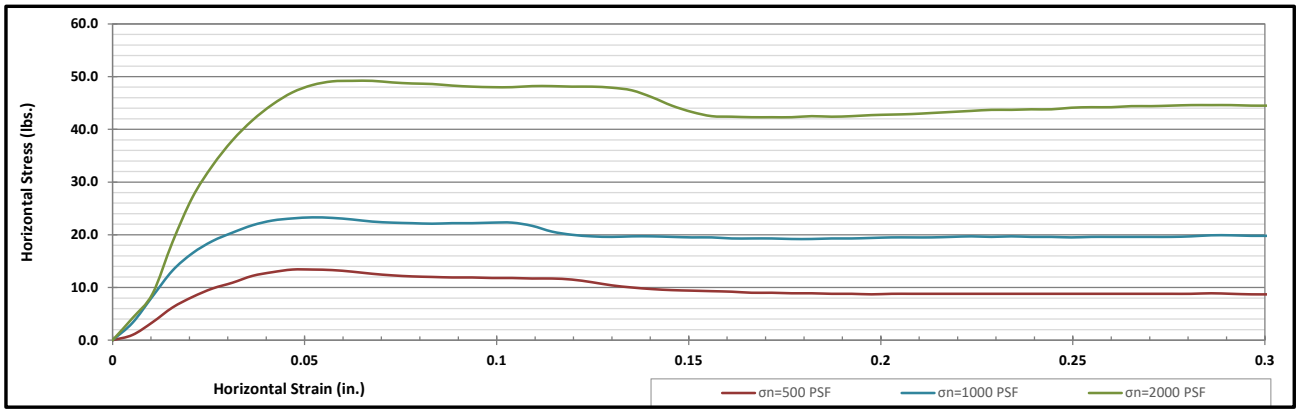
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	20.2	
	Initial	**Post-Consolidation**
Dry Density (PCF):	115.0	117.1
Void Ratio:	0.465	0.439
Porosity (%):	31.7	30.5
Degree of Saturation (%):	saturated	saturated

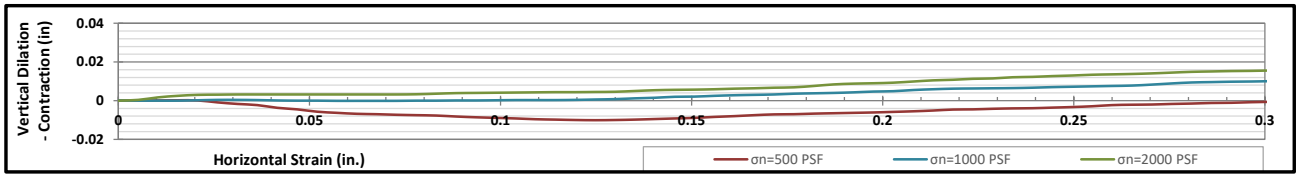
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	19.0	
	Initial	**Post-Consolidation**
Dry Density (PCF):	115.4	120.1
Void Ratio:	0.460	0.403
Porosity (%):	31.5	28.7
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**36**	**32**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	400	680	1440
Residual Horizontal Stress, τ_h (PSF):	250	570	1300





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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW-GT36-6.2-9.5 ft
Sample#: B21-1330

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 24-Aug-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

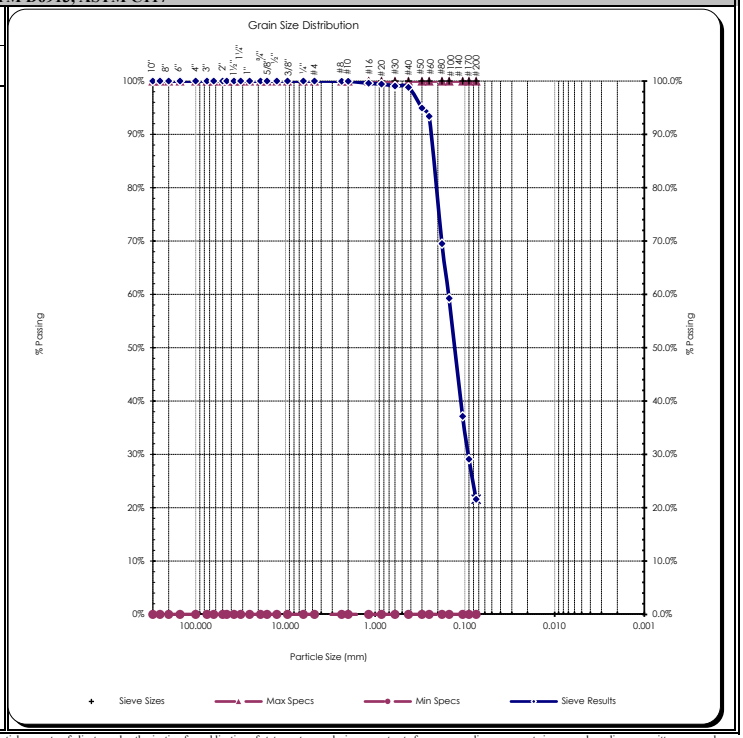
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.017	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.59
$D_{(10)}$ =	0.035	mm	% Sand =	78.4%	Coeff. of Uniformity, C_U = 4.38
$D_{(15)}$ =	0.052	mm	% Silt & Clay =	21.6%	Fineness Modulus = 0.47
$D_{(30)}$ =	0.092	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.132	mm	Plasticity Index =	n/a	Moisture %, as sampled = 27.5%
$D_{(60)}$ =	0.152	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.240	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	7/32		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850	99%	99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		95%	100.0%	0.0%
#60	0.250	93%	93%	100.0%	0.0%
#80	0.180		70%	100.0%	0.0%
#100	0.150	59%	59%	100.0%	0.0%
#140	0.106		37%	100.0%	0.0%
#170	0.090		29%	100.0%	0.0%
#200	0.075	21.6%	21.6%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW-GT36-11.7-32 ft
Sample#: B21-1332

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 24-Aug-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

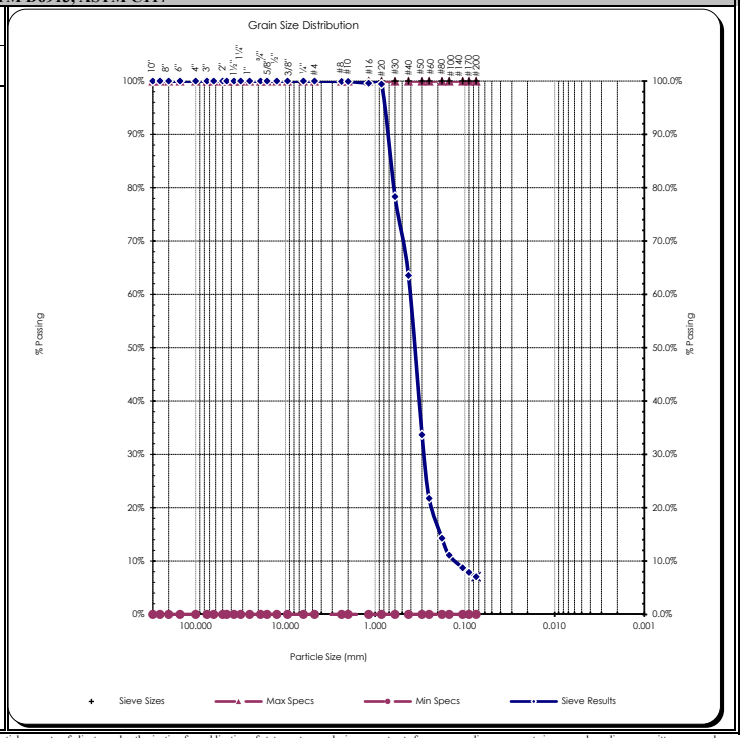
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.053	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C =	1.53
$D_{(10)}$ =	0.129	mm	% Sand =	92.9%	Coeff. of Uniformity, C_U =	3.18
$D_{(15)}$ =	0.186	mm	% Silt & Clay =	7.1%	Fineness Modulus =	1.77
$D_{(30)}$ =	0.285	mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.368	mm	Plasticity Index =	n/a	Moisture %, as sampled =	15.7%
$D_{(60)}$ =	0.410	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	0.738	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	1/9		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850	99%	99%	100.0%	0.0%
#30	0.600		78%	100.0%	0.0%
#40	0.425	64%	64%	100.0%	0.0%
#50	0.300		34%	100.0%	0.0%
#60	0.250	22%	22%	100.0%	0.0%
#80	0.180		14%	100.0%	0.0%
#100	0.150	11%	11%	100.0%	0.0%
#140	0.106		9%	100.0%	0.0%
#170	0.090		8%	100.0%	0.0%
#200	0.075	7.1%	7.1%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	25-Aug-21
Source:	LDW-GT36-32-34.7 ft	**Tested By:**	C. Kriss
Sample #:	B21-1333		

Visual Identification
Sand with Silt
Sample Color
brown

Liquid Limit Determination

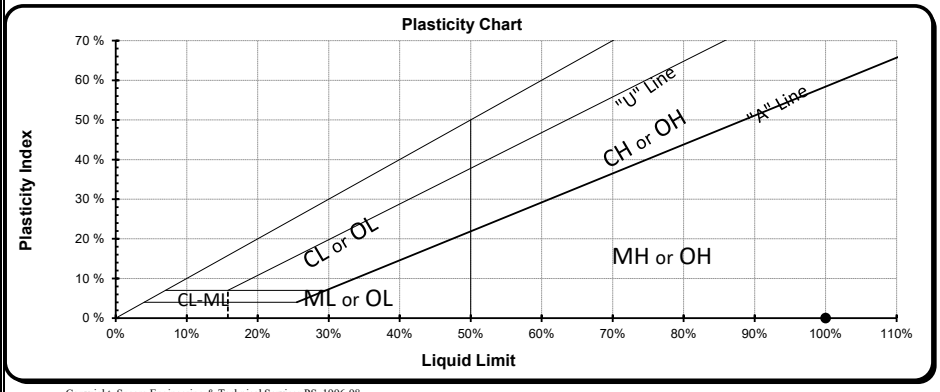
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Liquid Limit cannot be established				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

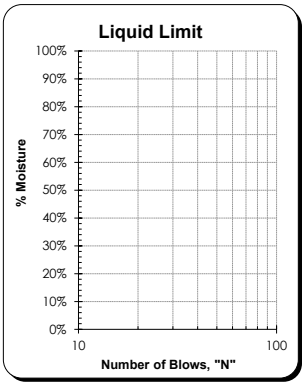
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Plastic Limit cannot be determined				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW-GT36-34.7-50 ft
Sample#: B21-1334

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 24-Aug-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
grayish-brown

ACCREDITED
Certificate #: 1366.01

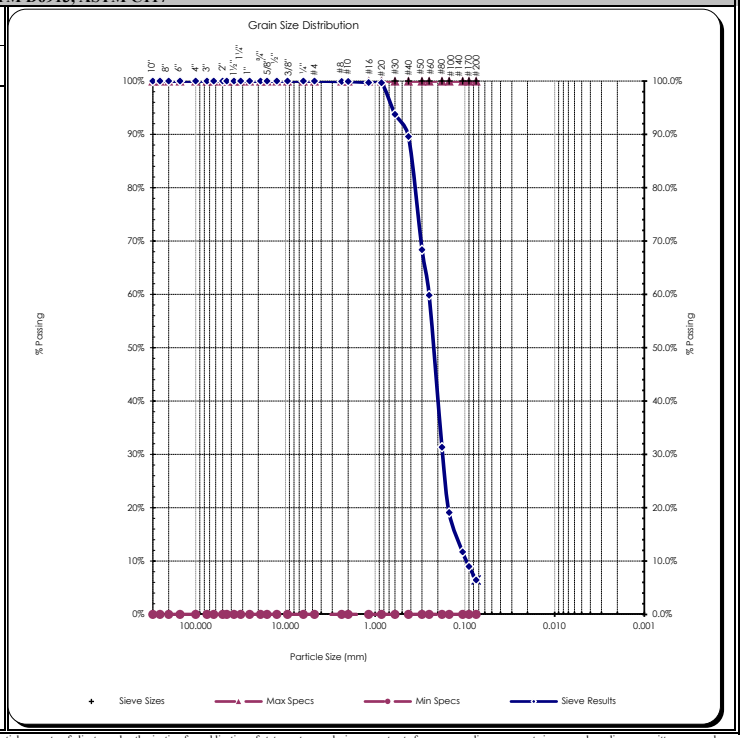
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.058	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C =	1.30
$D_{(10)}$ =	0.096	mm	% Sand =	93.5%	Coeff. of Uniformity, C_U =	2.62
$D_{(15)}$ =	0.126	mm	% Silt & Clay =	6.5%	Fineness Modulus =	1.19
$D_{(30)}$ =	0.177	mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.226	mm	Plasticity Index =	n/a	Moisture %, as sampled =	23.7%
$D_{(60)}$ =	0.251	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	0.441	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	6/83		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850	100%	100%	100.0%	0.0%
#30	0.600		94%	100.0%	0.0%
#40	0.425	90%	90%	100.0%	0.0%
#50	0.300		68%	100.0%	0.0%
#60	0.250	60%	60%	100.0%	0.0%
#80	0.180		31%	100.0%	0.0%
#100	0.150	19%	19%	100.0%	0.0%
#140	0.106		12%	100.0%	0.0%
#170	0.090		9%	100.0%	0.0%
#200	0.075	6.5%	6.5%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	25-Aug-21
Source:	LDW-GT-36-50.5-61.5 ft	**Tested By:**	C. Kriss
Sample #:	B21-1335		

Visual Identification
Silty Clay
Sample Color
brown

Liquid Limit Determination

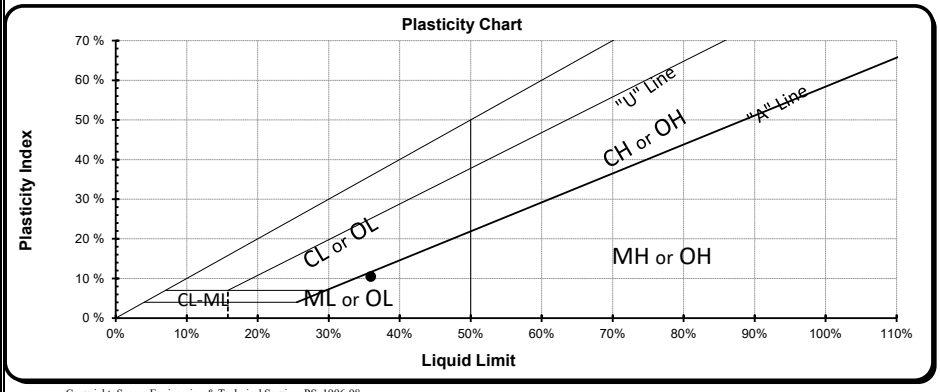
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	29.50	30.28	27.77			
Weight of Dry Soils + Pan:	26.95	27.50	24.20			
Weight of Pan:	19.61	19.98	14.98			
Weight of Dry Soils:	7.34	7.52	9.22			
Weight of Moisture:	2.55	2.78	3.57			
% Moisture:	34.7 %	37.0 %	38.7 %			
Number of Blows:	30	21	11			

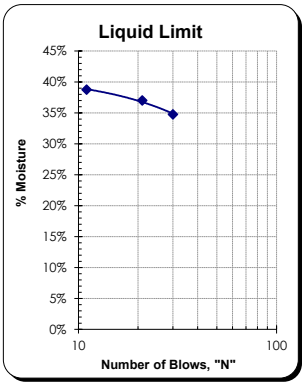
Liquid Limit @ 25 Blows: 36 %
Plastic Limit: 25 %
Plasticity Index, I_P: 11 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	34.74	35.86				
Weight of Dry Soils + Pan:	33.48	34.32				
Weight of Pan:	28.53	28.24				
Weight of Dry Soils:	4.95	6.08				
Weight of Moisture:	1.26	1.54				
% Moisture:	25.5 %	25.3 %				

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: _____

Reviewed by: _____
Meghan Blodgett-Carrillo

Client:	Anchor QEA	**Date:**	September 29, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-1447 - 1466
Revised on:		**Date sampled:**	7-8-21 & 7-9-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Date Received: July 29, 2021
Date Tested: August 31, 2021

Client: Anchor QEA
Sampled by: Client
Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1447	LDW21-GT21-GB-31-32.5 ft	222.3	700.9	590.1	110.8	367.8	30.1%
B21-1448	LDW21-GT12-GB-0-1.5 ft	208.8	636.4	466.8	169.6	258.0	65.7%
B21-1449	LDW21-GT12-GB-0-12 ft	224.0	851.3	609.9	241.4	385.9	62.6%
B21-1450	LDW21-GT12-GB-12-13.5 ft	233.8	567.3	458.5	108.8	224.7	48.4%
B21-1451	LDW21-GT12-GB-18-22 ft	222.9	780.0	643.4	136.6	420.5	32.5%
B21-1452	LDW21-GT12-GB-22-23.5 ft	229.4	723.2	606.3	116.9	376.9	31.0%
B21-1453	LDW21-GT11-GB-0-1.5 ft	221.8	617.6	440.0	177.6	218.2	81.4%
B21-1454	LDW21-GT11-GB-0-8.5 ft	233.8	686.2	473.2	213.0	239.4	89.0%
B21-1455	LDW21-GT11-GB-8.5-10 ft	224.8	616.6	455.4	161.2	230.6	69.9%
B21-1456	LDW21-GT11-GB-8.5-16.7 ft	182.3	495.3	374.9	120.4	192.6	62.5%
B21-1457	LDW21-GT11-GB-16.7-18.5 ft	186.7	993.2	821.5	171.7	634.8	27.0%
B21-1458	LDW21-GT11-GB-18.5-20 ft	220.1	643.5	566.8	76.7	346.7	22.1%
B21-1459	LDW21-GT9-GB-0-1.5 ft	221.4	388.1	331.3	56.8	109.9	51.7%
B21-1460	LDW21-GT9-GB-10-11.5 ft	225.6	534.4	429.8	104.6	204.2	51.2%
B21-1461	LDW21-GT9-GB-16-20 ft	225.7	665.4	521.2	144.2	295.5	48.8%
B21-1462	LDW21-GT9-GB-20-21.5 ft	235.5	299.4	285.9	13.5	50.4	26.8%
B21-1463	LDW21-GT7-GB-0-1.5 ft	301.1	545.2	480.4	64.8	179.3	36.1%
B21-1464	LDW21-GT7-GB-0-5.7 ft	182.9	988.2	806.6	181.6	623.7	29.1%
B21-1465	LDW21-GT7-GB-8.5-10 ft	217.2	591.3	504.5	86.8	287.3	30.2%
B21-1466	LDW21-GT7-GB-8.5-18.5 ft	233.4	693.2	578.2	115.0	344.8	33.4%

Name correction:
LDW21-GT9-GB-10-20

Reviewed by:

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: August 31, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-1449	LDW21-GT12-GB-0-12 ft	493.02	545.53	52.5	TSA-012	180.4	499.5	0.99749	742.00	709.46	23.2	2.6294442	0.99929	2.6275773
B21-1451	LDW21-GT12-GB-18-22 ft	497.56	597.70	100.1	TSA-023	163.9	498.7	0.99749	723.96	661.41	23.2	2.6641366	0.99929	2.6622451
B21-1459	LDW21-GT9-GB-0-1.5 ft	601.92	676.89	75.0	TSA-015	187.6	499.5	0.99749	732.66	685.85	23.2	2.6626339	0.99929	2.6607434
B21-1461	LDW21-GT7-GB-0-5.7 ft	502.15	601.95	99.8	TSA-021	183.4	499.4	0.99749	744.55	681.58	23.2	2.7100064	0.99929	2.7080823

Reviewed by: Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	31-Aug-21
Source:	LDW21-GT12-GB-0-12 ft	**Tested By:**	C. Kriss
Sample #:	B21-1449		

Visual Identification
Clayey Silt with Sand
Sample Color
brown

Liquid Limit Determination

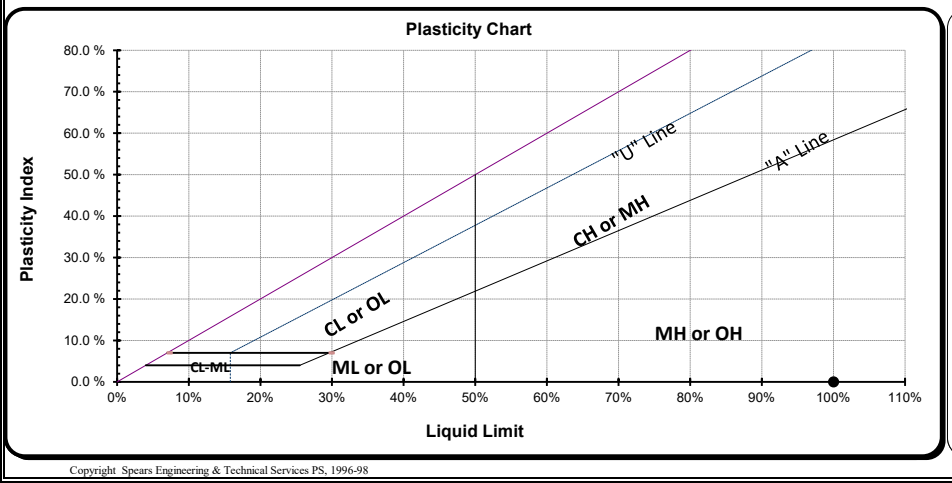
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Liquid limit cannot be established				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

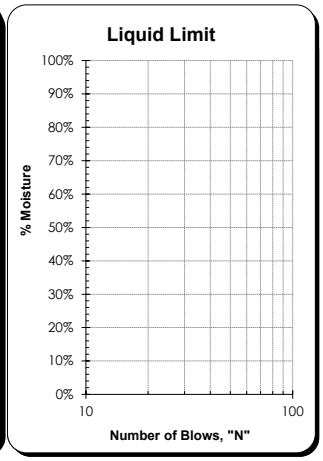
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Plastic limit cannot be determined				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT12-GB-18-22 ft
Sample#: B21-1451

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 31-Aug-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

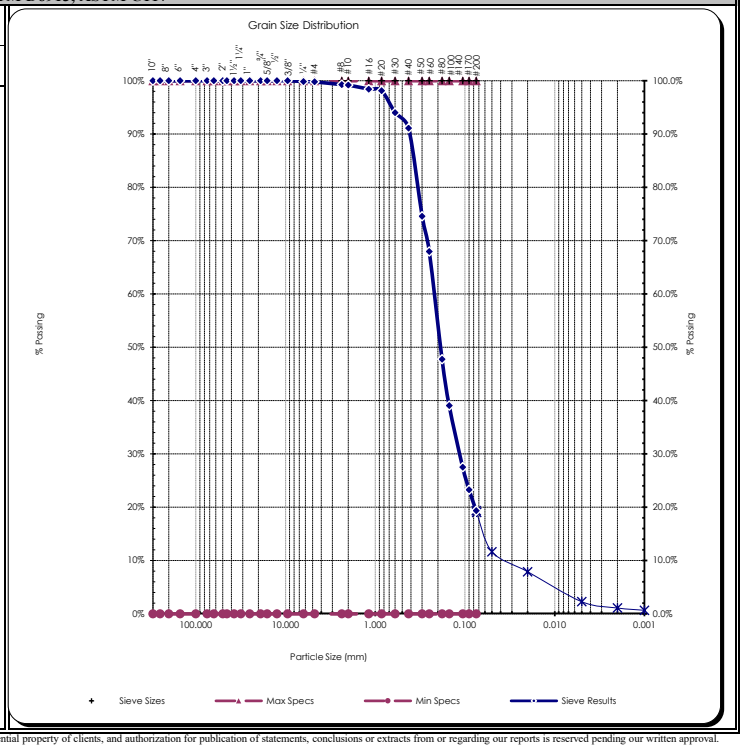
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.010	mm	% Gravel =	0.2%	Coeff. of Curvature, C_C = 1.73
$D_{(10)}$ =	0.035	mm	% Sand =	80.4%	Coeff. of Uniformity, C_U = 6.41
$D_{(15)}$ =	0.062	mm	% Silt & Clay =	19.3%	Fineness Modulus = 0.95
$D_{(30)}$ =	0.115	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.188	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 32.5%
$D_{(60)}$ =	0.222	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.417	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	7/33		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		98%	100.0%	0.0%
#20	0.850	98%	98%	100.0%	0.0%
#30	0.600		94%	100.0%	0.0%
#40	0.425	91%	91%	100.0%	0.0%
#50	0.300		75%	100.0%	0.0%
#60	0.250	68%	68%	100.0%	0.0%
#80	0.180		48%	100.0%	0.0%
#100	0.150	39%	39%	100.0%	0.0%
#140	0.106		28%	100.0%	0.0%
#170	0.090		23%	100.0%	0.0%
#200	0.075	19.3%	19.3%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21	**Unified Soil Classification System, ASTM-2487**	
Project #:	21B233	**Sampled By:**	Client	SM, Silty Sand	
Client :	Anchor QEA	**Date Tested:**	31-Aug-21	**Sample Color**	
Source:	LDW21-GT12-GB-18-22 ft	**Tested By:**	C. Kriss	brown	
Sample#:	B21-1451				

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr :	2.66	
Sample Weight:	102.98	grams
Hydroscopic Moist.:	1.38%	
Adj. Sample Wgt :	101.58	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter	
1	12	11.7%	0.0516	mm
2	10.5	10.3%	0.0370	mm
5	9	8.8%	0.0235	mm
15	6.5	6.3%	0.0138	mm
30	5	4.9%	0.0098	mm
60	3.5	3.4%	0.0070	mm
240	1.5	1.5%	0.0035	mm
1440	1	1.0%	0.0014	mm

% Gravel:	0.2%	**Liquid Limit:**	0.0 %
% Sand:	80.4%	**Plastic Limit:**	0.0 %
% Silt:	17.1%	**Plasticity Index:**	0.0 %
% Clay:	2.3%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter	
3.0"	100%	75.000	mm
2.0"	100%	50.000	mm
1.5"	100%	37.500	mm
1.25"	100%	31.500	mm
1.0"	100%	25.000	mm
3/4"	100%	19.000	mm
5/8"	100%	16.000	mm
1/2"	100%	12.500	mm
3/8"	100%	9.500	mm
1/4"	100%	6.300	mm
#4	100%	4.750	mm
#10	99%	2.000	mm
#20	98%	0.850	mm
#40	91%	0.425	mm
#100	39%	0.150	mm
#200	19.3%	0.075	mm
Silts	19.0%	0.074	mm
	11.7%	0.050	mm
	7.9%	0.020	mm
Clays	2.3%	0.005	mm
	1.1%	0.002	mm
Colloids	0.7%	0.001	mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sand

Comments:

Reviewed by: Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

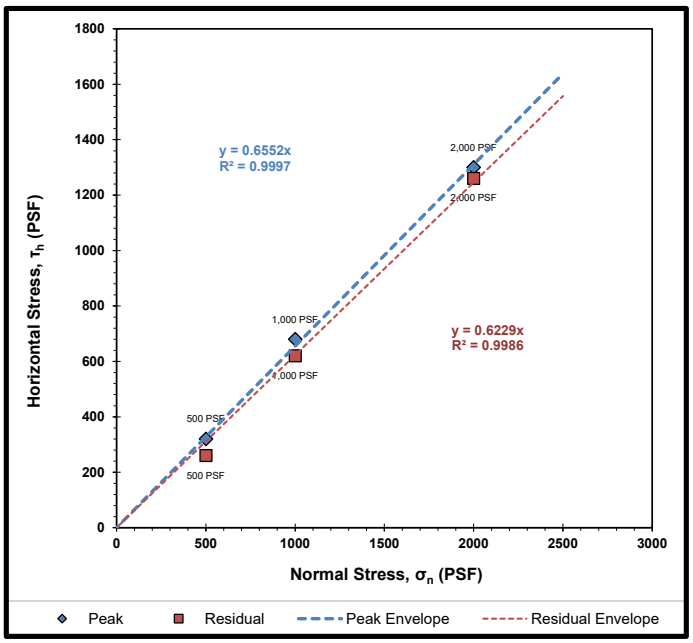
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT12-GB-18-22 ft
Laboratory Sample ID:	B21-1451	**Visual Soil Description:**	brown clayey silt
Sample Date:	7/8/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	8/23/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	34.3	
	Initial	**Post-Consolidation**
Dry Density (PCF):	104.7	112.4
Void Ratio:	0.609	0.499
Porosity (%):	37.9	33.3
Degree of Saturation (%):	saturated	saturated

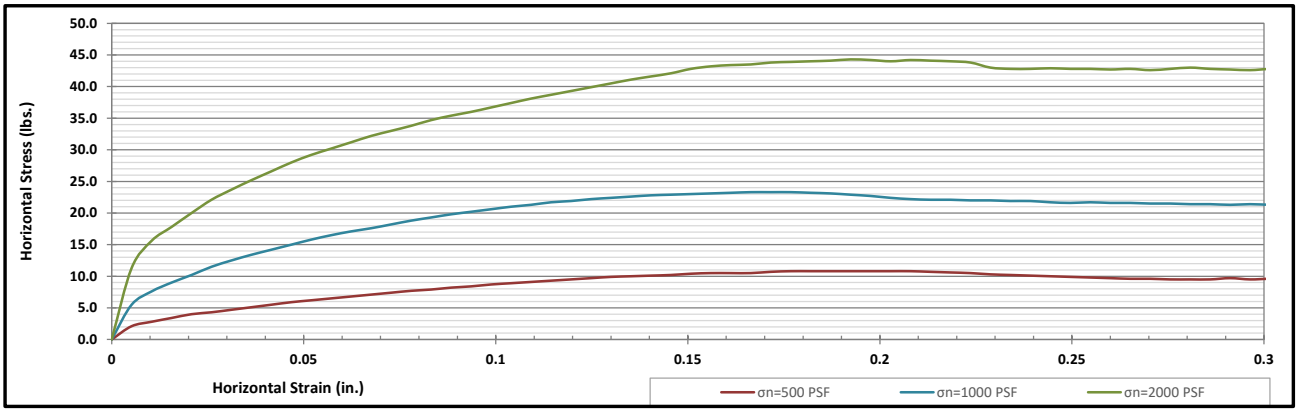
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	32.5	
	Initial	**Post-Consolidation**
Dry Density (PCF):	106.6	117.5
Void Ratio:	0.580	0.433
Porosity (%):	36.7	30.2
Degree of Saturation (%):	saturated	saturated

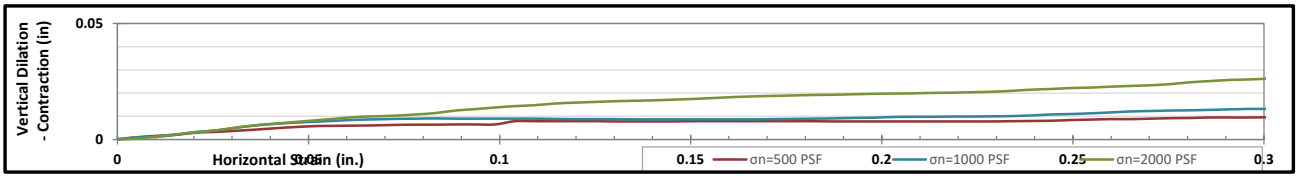
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	34.7	
	Initial	**Post-Consolidation**
Dry Density (PCF):	104.7	119.6
Void Ratio:	0.609	0.409
Porosity (%):	37.8	29.0
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**33**	**32**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	320	680	1300
Residual Horizontal Stress, τ_h (PSF):	260	620	1260





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NW Region • 805 Dupont, Suite #5 • Bellingham, WA 98225 • Phone 360.647.6061 • Fax 360.647.8111
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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT11-GB-0-8.5 ft
Sample#: B21-1454

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 31-Aug-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
ML, Sandy Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

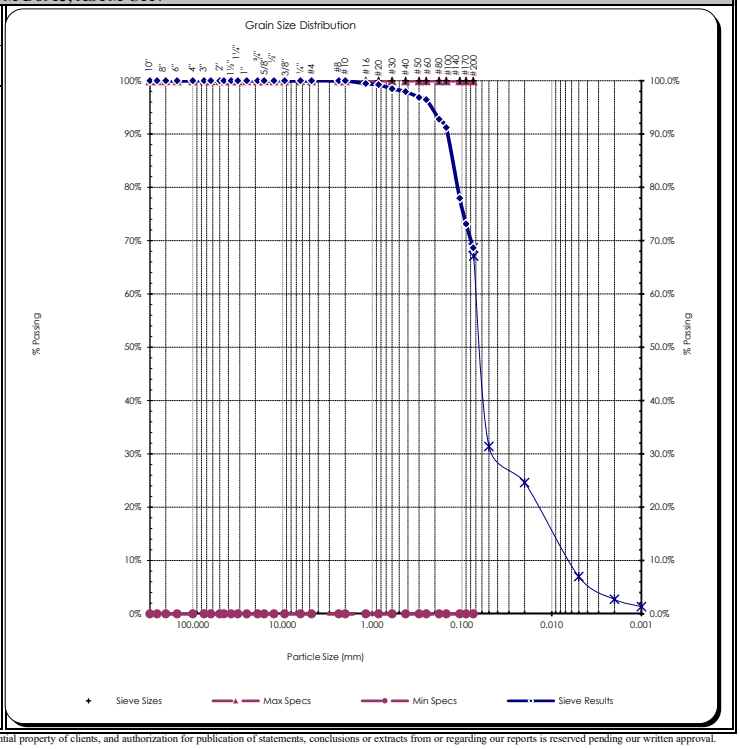
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.004	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 3.47
$D_{(10)}$ =	0.007	mm	% Sand =	31.3%	Coeff. of Uniformity, C_U = 9.80
$D_{(15)}$ =	0.010	mm	% Silt & Clay =	68.7%	Fineness Modulus = 0.14
$D_{(30)}$ =	0.041	mm	Liquid Limit =	40.6%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.063	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 89.0%
$D_{(60)}$ =	0.069	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.146	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	68/97		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850	99%	99%	100.0%	0.0%
#30	0.600		98%	100.0%	0.0%
#40	0.425	98%	98%	100.0%	0.0%
#50	0.300		97%	100.0%	0.0%
#60	0.250	96%	96%	100.0%	0.0%
#80	0.180		93%	100.0%	0.0%
#100	0.150	91%	91%	100.0%	0.0%
#140	0.106		78%	100.0%	0.0%
#170	0.090		73%	100.0%	0.0%
#200	0.075	68.7%	68.7%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	31-Aug-21
Source:	LDW21-GT11-GB-0-8.5 ft	**Tested By:**	C. Kriss
Sample#:	B21-1454		

Unified Soil Classification System, ASTM-2487
ML, Sandy Silt
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	53.60	grams
Hydroscopic Moist.:	4.63%	
Adj. Sample Wgt :	51.23	grams

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Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	16	31.2%	0.0505 mm
2	15	29.3%	0.0359 mm
5	14	27.3%	0.0228 mm
15	9.5	18.5%	0.0136 mm
30	7.5	14.6%	0.0097 mm
60	5	9.8%	0.0069 mm
240	2.5	4.9%	0.0035 mm
1440	1	2.0%	0.0014 mm

% Gravel:	0.0%	**Liquid Limit:**	40.6 %
% Sand:	31.3%	**Plastic Limit:**	0.0 %
% Silt:	61.7%	**Plasticity Index:**	0.0 %
% Clay:	7.0%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	99%	0.850 mm
#40	98%	0.425 mm
#100	91%	0.150 mm
#200	68.7%	0.075 mm
Silts	67.1%	0.074 mm
	31.4%	0.050 mm
	24.6%	0.020 mm
Clays	7.0%	0.005 mm
	2.7%	0.002 mm
Colloids	1.4%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sandy Loam

Comments:

Reviewed by: Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	31-Aug-21
Source:	LDW21-GT11-GB-0-8.5 ft	**Tested By:**	C. Kriss
Sample #:	B21-1454		

Unified Soils Classification System, ASTM D-2487
ML, Sandy Silt
Sample Color
brown

ACCREDITED
Certificate #: 1366.01

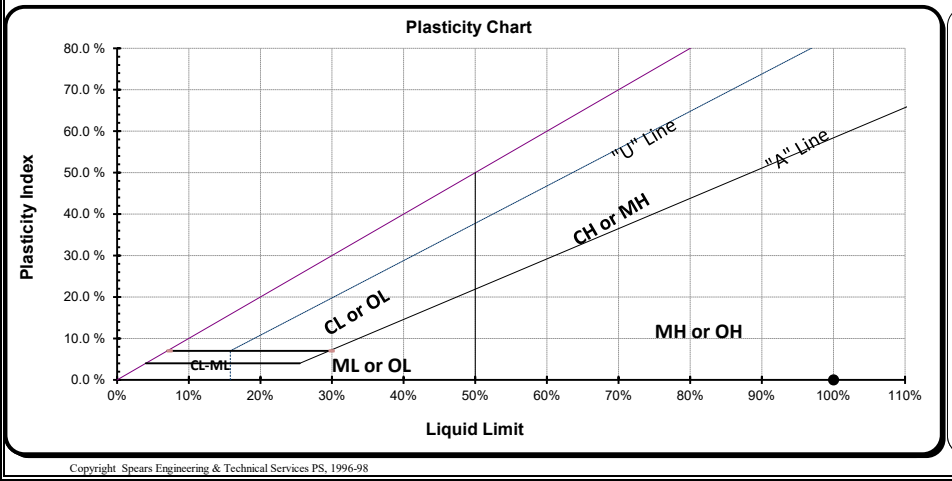
Liquid Limit Determination

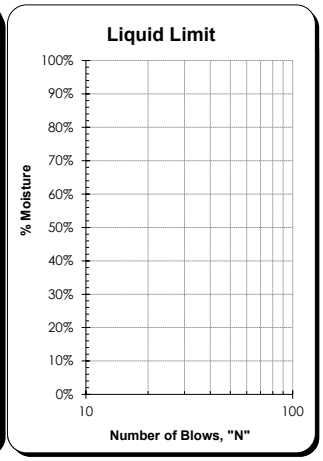
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	32.18	28.53	30.48			
Weight of Dry Soils + Pan:	28.57	24.52	27.32			
Weight of Pan:	19.55	15.03	19.88			
Weight of Dry Soils:	9.02	9.49	7.44			
Weight of Moisture:	3.61	4.01	3.16			
% Moisture:	40.0 %	42.3 %	42.5 %			
Number of Blows:	28	17	15			

Liquid Limit @ 25 Blows: 41 %
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling.

Reviewed by: Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

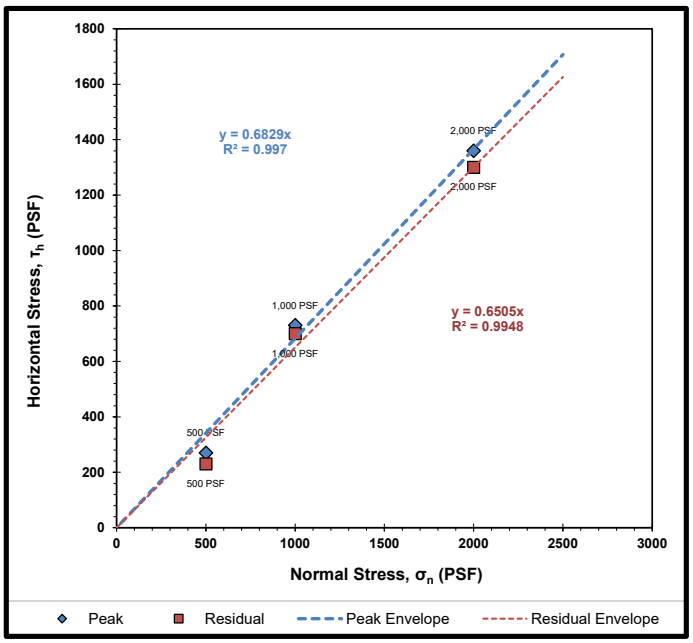
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT11-GB-0-8.5 ft
Laboratory Sample ID:	B21-1454	**Visual Soil Description:**	brown silty clay
Sample Date:	7/8/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	8/26/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0042
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	58.2	
	Initial	**Post-Consolidation**
Dry Density (PCF):	76.6	86.1
Void Ratio:	1.201	0.957
Porosity (%):	54.6	48.9
Degree of Saturation (%):	saturated	saturated

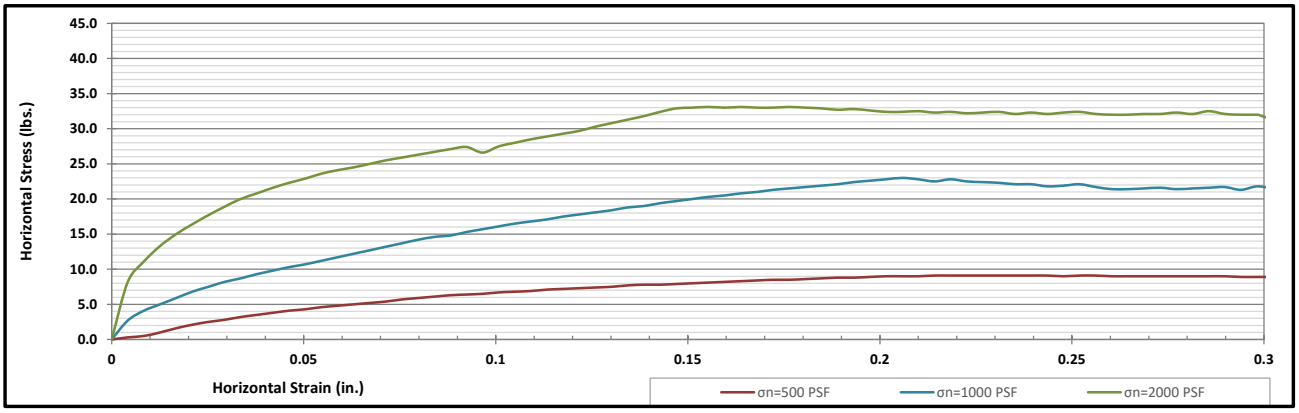
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	54.1	
	Initial	**Post-Consolidation**
Dry Density (PCF):	78.1	94.3
Void Ratio:	1.157	0.786
Porosity (%):	53.6	44.0
Degree of Saturation (%):	saturated	saturated

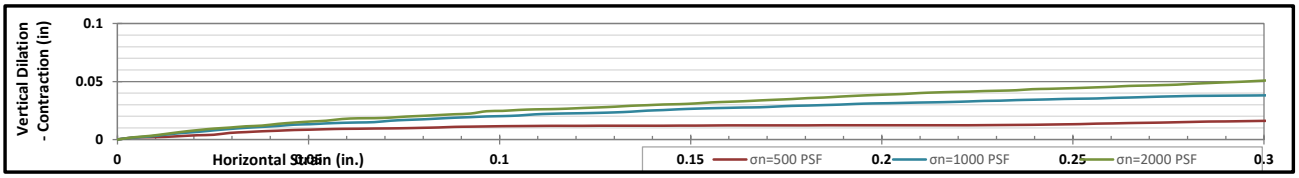
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	57.2	
	Initial	**Post-Consolidation**
Dry Density (PCF):	78.4	103.4
Void Ratio:	1.149	0.630
Porosity (%):	53.5	38.6
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**34**	**33**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	270	730	1360
Residual Horizontal Stress, τ_h (PSF):	230	700	1300





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NW Region • 805 Dupont, Suite #5 • Bellingham, WA 98225 • Phone 360.647.6061 • Fax 360.647.8111
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Visit our website: www.mtc-inc.net

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	31-Aug-21
Source:	LDW21-GT11-GB-8.5-16.7 ft	**Tested By:**	C. Kriss
Sample #:	B21-1456		

Visual Identification
Clayey Silt
Sample Color
brown

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	33.23	29.16	29.46			
Weight of Dry Soils + Pan:	29.57	25.20	25.24			
Weight of Pan:	19.86	15.05	14.81			
Weight of Dry Soils:	9.71	10.15	10.43			
Weight of Moisture:	3.66	3.96	4.22			
% Moisture:	37.7 %	39.0 %	40.5 %			
Number of Blows:	26	17	11			

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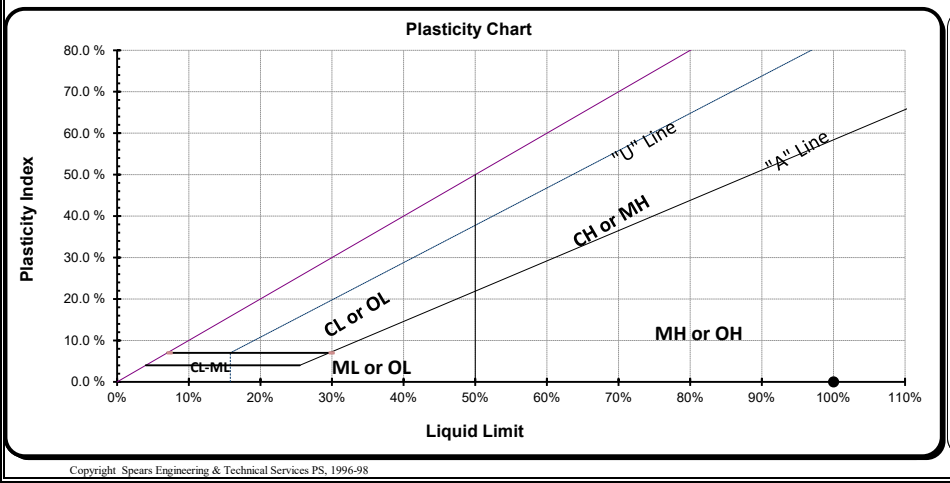
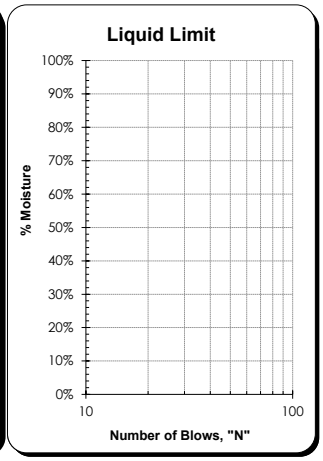
Certificate #: 1366.01

Liquid Limit @ 25 Blows: 38 %
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Plastic limit cannot be determined				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT11-GB-16.7-18.5 ft
Sample#: B21-1457

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 31-Aug-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
gray

ACCREDITED
Certificate #: 1366.01

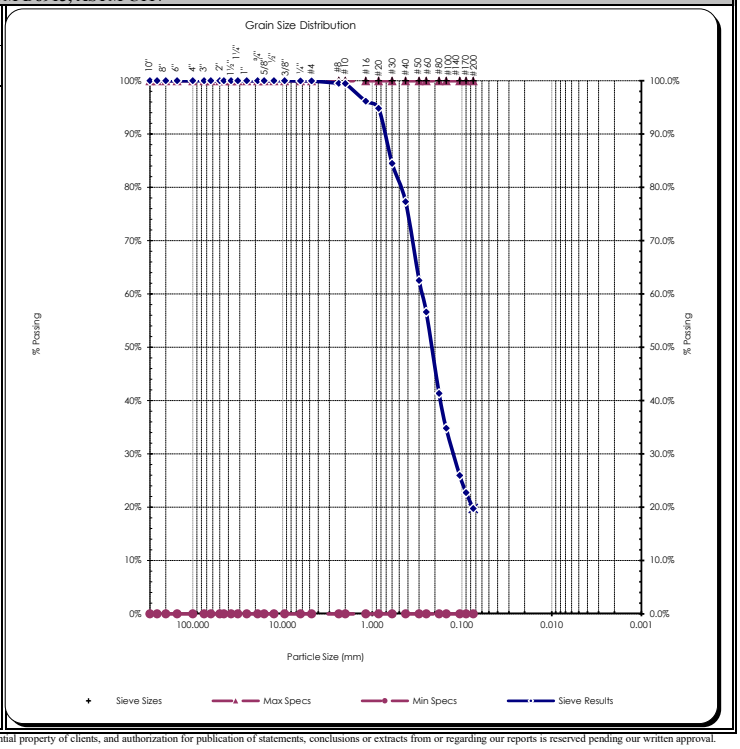
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.019	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.50
$D_{(10)}$ =	0.038	mm	% Sand =	80.2%	Coeff. of Uniformity, C_U = 7.34
$D_{(15)}$ =	0.057	mm	% Silt & Clay =	19.8%	Fineness Modulus = 1.22
$D_{(30)}$ =	0.126	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.220	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 27.0%
$D_{(60)}$ =	0.279	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.733	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	23/90		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		96%	100.0%	0.0%
#20	0.850	95%	95%	100.0%	0.0%
#30	0.600		85%	100.0%	0.0%
#40	0.425	77%	77%	100.0%	0.0%
#50	0.300		63%	100.0%	0.0%
#60	0.250	57%	57%	100.0%	0.0%
#80	0.180		41%	100.0%	0.0%
#100	0.150	35%	35%	100.0%	0.0%
#140	0.106		26%	100.0%	0.0%
#170	0.090		23%	100.0%	0.0%
#200	0.075	19.8%	19.8%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	31-Aug-21
Source:	LDW21-GT9-GB-0-1.5 ft	**Tested By:**	C. Kriss
Sample #:	B21-1459		

Visual Identification
Sandy Silt
Sample Color
brown

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Liquid limit cannot be established				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

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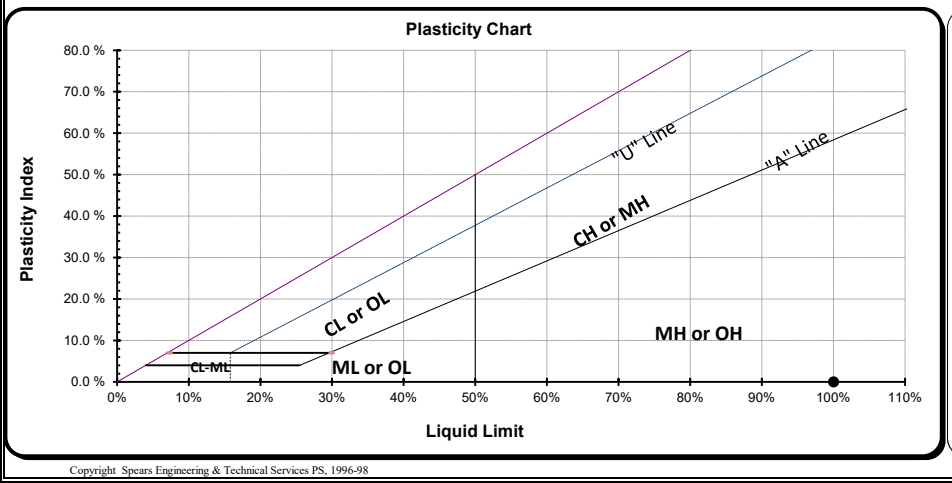
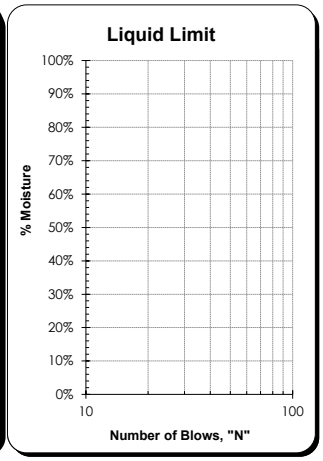
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Plastic limit cannot be determined				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	31-Aug-21
Source:	LDW21-GT9-GB-~~16-20 ft~~		C. Kriss
Sample #:	B21-1461		

Name correction:
LDW21-GT9-GB-10-20

Visual Identification
Sandy Silt with Clay
Sample Color
brown

Liquid Limit Determination

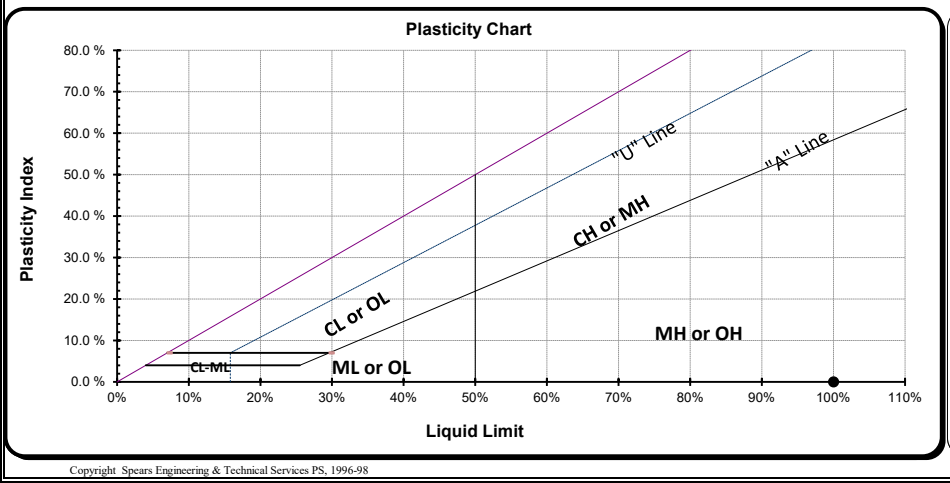
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Liquid limit cannot be established					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

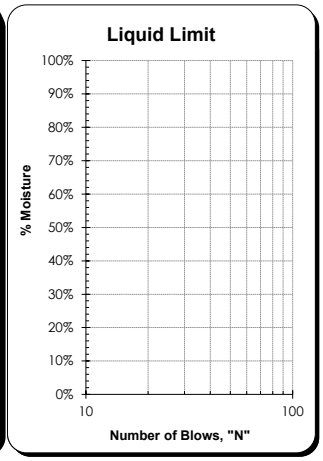
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:
Meghan Blodgett-Carrillo

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT9-GB-20-21.5 ft
Sample#: B21-1462

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 31-Aug-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

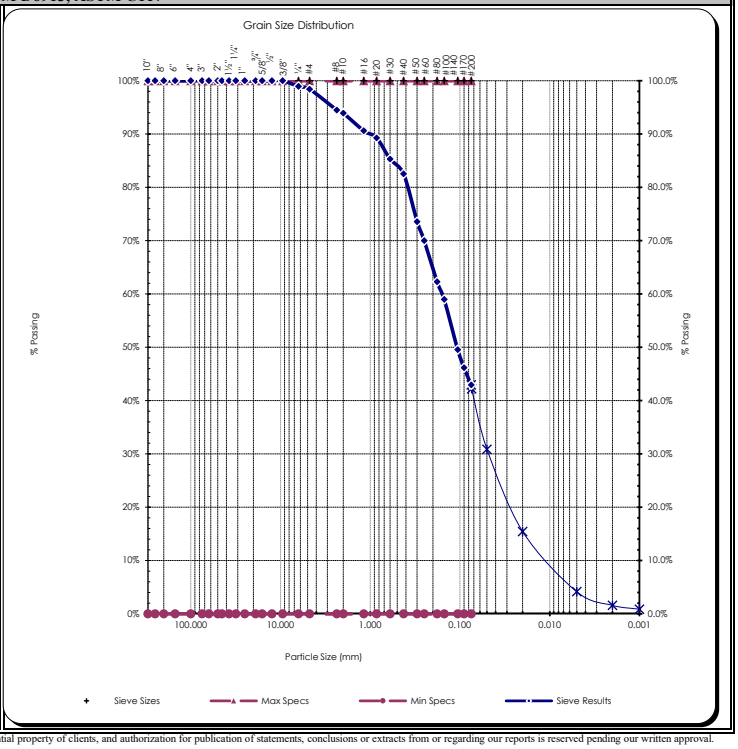
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.006	mm	% Gravel =	1.6%	Coeff. of Curvature, C_C = 2.18
$D_{(10)}$ =	0.010	mm	% Sand =	55.5%	Coeff. of Uniformity, C_U = 16.63
$D_{(15)}$ =	0.019	mm	% Silt & Clay =	43.0%	Fineness Modulus = 0.99
$D_{(30)}$ =	0.058	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.108	mm	Plasticity Index =	n/a	Moisture %, as sampled = 26.8%
$D_{(60)}$ =	0.159	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.026	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	38/73		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	98%	98%	100.0%	0.0%
#8	2.36		95%	100.0%	0.0%
#10	2.00	94%	94%	100.0%	0.0%
#16	1.18		91%	100.0%	0.0%
#20	0.850	89%	89%	100.0%	0.0%
#30	0.600		85%	100.0%	0.0%
#40	0.425	83%	83%	100.0%	0.0%
#50	0.300		74%	100.0%	0.0%
#60	0.250	70%	70%	100.0%	0.0%
#80	0.180		62%	100.0%	0.0%
#100	0.150	59%	59%	100.0%	0.0%
#140	0.106		50%	100.0%	0.0%
#170	0.090		46%	100.0%	0.0%
#200	0.075	43.0%	43.0%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21	**Unified Soil Classification System, ASTM-2487**	
Project #:	21B233	**Sampled By:**	Client	SM, Silty Sand	
Client :	Anchor QEA	**Date Tested:**	31-Aug-21	**Sample Color**	
Source:	LDW21-GT9-GB-20-21.5 ft	**Tested By:**	C. Kriss	brown	
Sample#:	B21-1462				

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	75.17	grams
Hydroscopic Moist.:	1.11%	
Adj. Sample Wgt :	74.34	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	19	24.0%	0.0496 mm
2	16.5	20.8%	0.0357 mm
5	13.5	17.1%	0.0230 mm
15	9.5	12.0%	0.0136 mm
30	8	10.1%	0.0097 mm
60	5	6.3%	0.0069 mm
240	2	2.5%	0.0035 mm
1440	1	1.3%	0.0014 mm

% Gravel:	1.6%	**Liquid Limit:**	n/a
% Sand:	55.5%	**Plastic Limit:**	n/a
% Silt:	38.8%	**Plasticity Index:**	n/a
% Clay:	4.2%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	99%	6.300 mm
#4	98%	4.750 mm
#10	94%	2.000 mm
#20	89%	0.850 mm
#40	83%	0.425 mm
#100	59%	0.150 mm
#200	43.0%	0.075 mm
Silts	42.2%	0.074 mm
	30.9%	0.050 mm
	15.4%	0.020 mm
Clays	4.2%	0.005 mm
	1.6%	0.002 mm
Colloids	0.9%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sandy Loam

Comments:

Reviewed by: Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

MATERIALS TESTING & CONSULTING, INC.

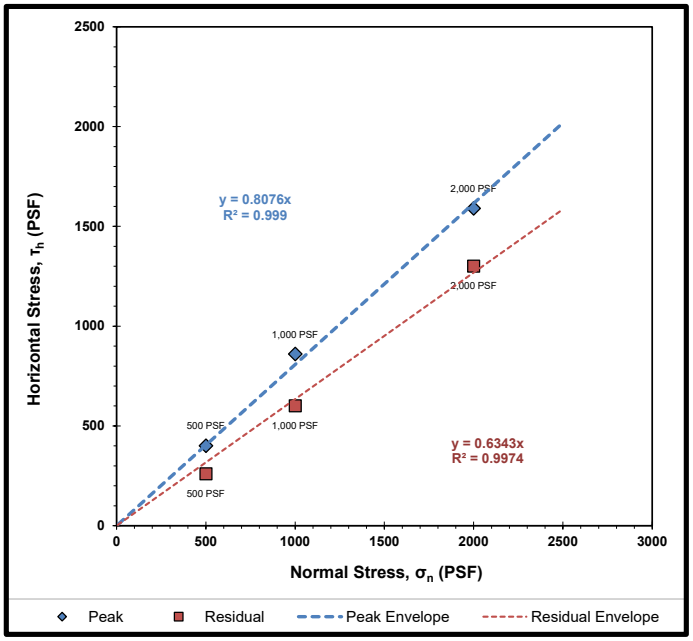
Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT9-GB-20-21.5 ft
Laboratory Sample ID:	B21-1462	**Visual Soil Description:**	brown silty sand
Sample Date:	7/8/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	8/31/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0042
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	22.7	
	Initial	**Post-Consolidation**
Dry Density (PCF):	112.8	114.5
Void Ratio:	0.494	0.471
Porosity (%):	33.0	32.0
Degree of Saturation (%):	saturated	saturated

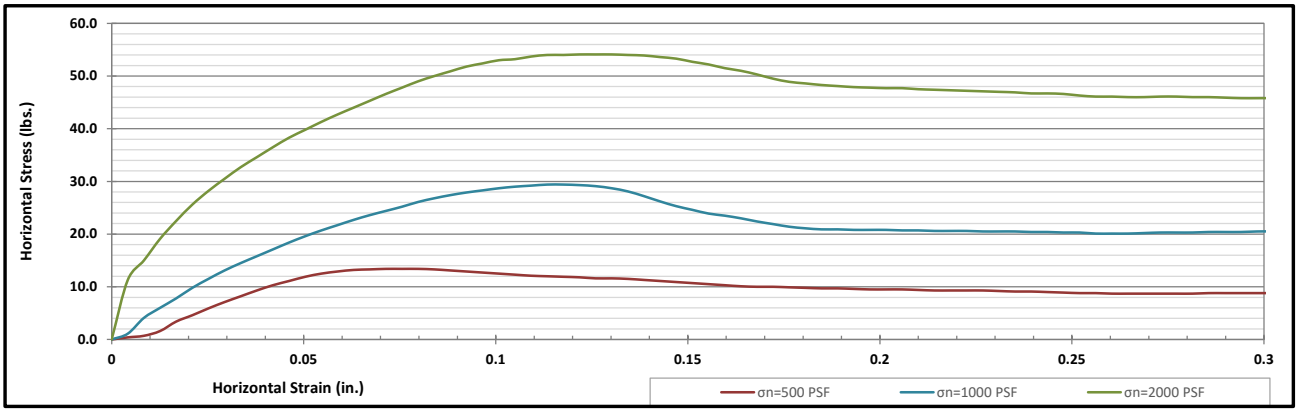
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	21.4	
	Initial	**Post-Consolidation**
Dry Density (PCF):	113.5	120.4
Void Ratio:	0.485	0.399
Porosity (%):	32.7	28.5
Degree of Saturation (%):	saturated	saturated

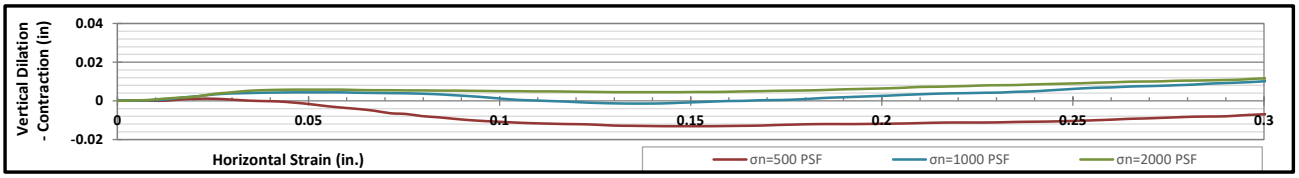
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	19.9	
	Initial	**Post-Consolidation**
Dry Density (PCF):	114.3	123.5
Void Ratio:	0.474	0.364
Porosity (%):	32.1	26.7
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS		
	PEAK	**RESIDUAL**
Angle of Internal Friction, ϕ (°):	**39**	**32**
Cohesion (PSF):	**0**	**0**



Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	400	860	1590
Residual Horizontal Stress, τ_h (PSF):	260	600	1300





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Kitsap Region • 5451 N.W. Newberry Hill Road, Suite 101 • Silverdale, WA 98383 • Phone/Fax 360.698.6787

Visit our website: www.mtc-inc.net

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT7-GB-0-5.7 ft
Sample#: B21-1464

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 31-Aug-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

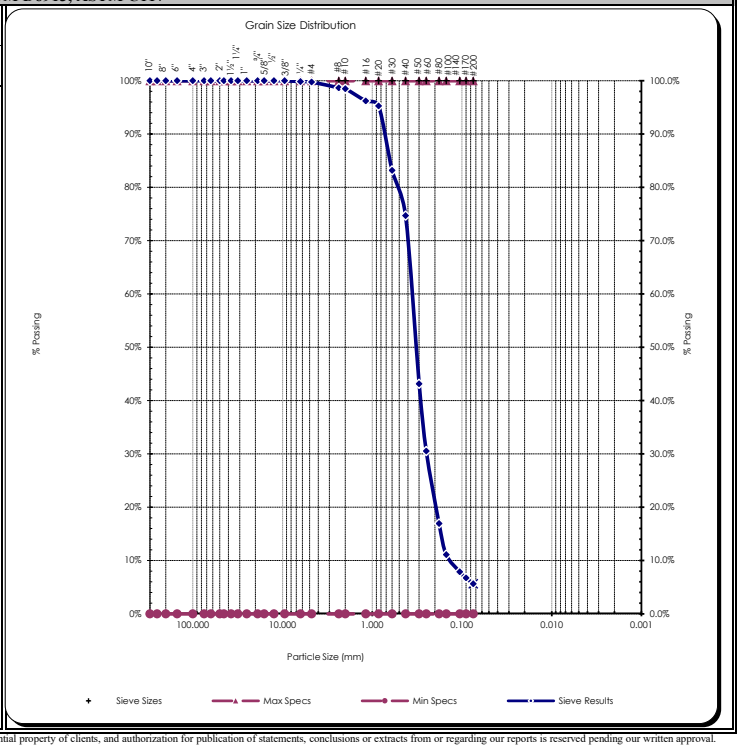
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.066	mm	% Gravel =	0.2%	Coeff. of Curvature, C_C = 1.24
$D_{(10)}$ =	0.135	mm	% Sand =	94.1%	Coeff. of Uniformity, C_U = 2.73
$D_{(15)}$ =	0.170	mm	% Silt & Clay =	5.6%	Fineness Modulus = 1.68
$D_{(30)}$ =	0.247	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.327	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 29.1%
$D_{(60)}$ =	0.367	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.741	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	4/53		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		96%	100.0%	0.0%
#20	0.850	95%	95%	100.0%	0.0%
#30	0.600		83%	100.0%	0.0%
#40	0.425	75%	75%	100.0%	0.0%
#50	0.300		43%	100.0%	0.0%
#60	0.250	31%	31%	100.0%	0.0%
#80	0.180		17%	100.0%	0.0%
#100	0.150	11%	11%	100.0%	0.0%
#140	0.106		8%	100.0%	0.0%
#170	0.090		7%	100.0%	0.0%
#200	0.075	5.6%	5.6%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT7-GB-8.5-18.5 ft
Sample#: B21-1466

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 31-Aug-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

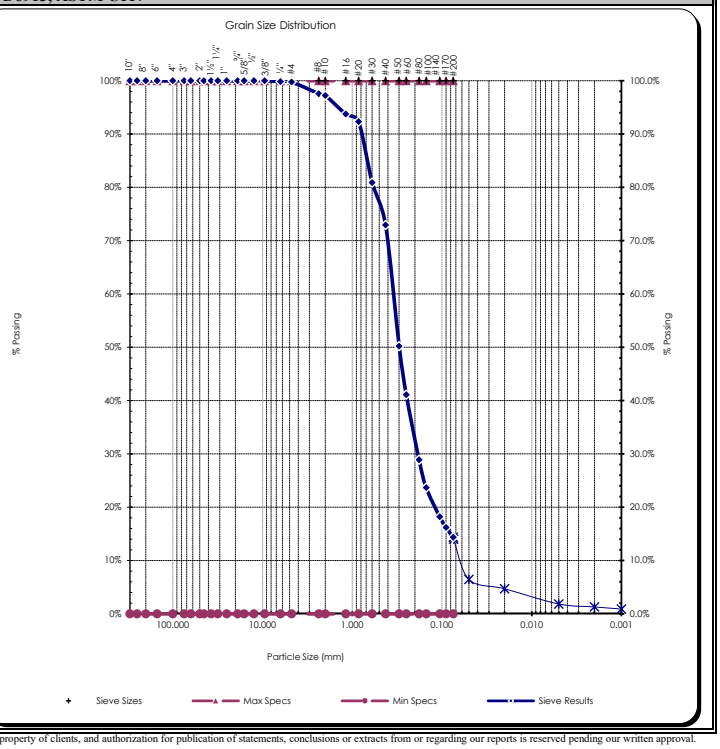
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.022	mm	% Gravel =	0.2%	Coeff. of Curvature, C_C = 1.55
$D_{(10)}$ =	0.063	mm	% Sand =	85.4%	Coeff. of Uniformity, C_U = 5.61
$D_{(15)}$ =	0.080	mm	% Silt & Clay =	14.4%	Fineness Modulus = 1.54
$D_{(30)}$ =	0.186	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.299	mm	Plasticity Index =	n/a	Moisture %, as sampled = 33.4%
$D_{(60)}$ =	0.354	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.799	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	13/66		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	97%	97%	100.0%	0.0%
#16	1.18		94%	100.0%	0.0%
#20	0.850	92%	92%	100.0%	0.0%
#30	0.600		81%	100.0%	0.0%
#40	0.425	73%	73%	100.0%	0.0%
#50	0.300		50%	100.0%	0.0%
#60	0.250	41%	41%	100.0%	0.0%
#80	0.180		29%	100.0%	0.0%
#100	0.150	24%	24%	100.0%	0.0%
#140	0.106		18%	100.0%	0.0%
#170	0.090		16%	100.0%	0.0%
#200	0.075	14.4%	14.4%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21	**Unified Soil Classification System, ASTM-2487**	
Project #:	21B233	**Sampled By:**	Client	SM, Silty Sand	
Client :	Anchor QEA	**Date Tested:**	31-Aug-21	**Sample Color**	
Source:	LDW21-GT7-GB-8.5-18.5 ft	**Tested By:**	C. Kriss	brown	
Sample#:	B21-1466				

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	75.16	grams
Hydroscopic Moist.:	1.29%	
Adj. Sample Wgt :	74.20	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	5	6.6%	0.0537 mm
2	4.5	5.9%	0.0381 mm
5	4	5.2%	0.0241 mm
15	3	3.9%	0.0140 mm
30	2.5	3.3%	0.0100 mm
60	2	2.6%	0.0070 mm
240	1	1.3%	0.0035 mm
1440	1	1.3%	0.0014 mm

% Gravel:	0.2%	**Liquid Limit:**	n/a
% Sand:	85.4%	**Plastic Limit:**	n/a
% Silt:	12.5%	**Plasticity Index:**	n/a
% Clay:	1.9%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	97%	2.000 mm
#20	92%	0.850 mm
#40	73%	0.425 mm
#100	24%	0.150 mm
#200	14.4%	0.075 mm
Silts	14.0%	0.074 mm
	6.5%	0.050 mm
	4.7%	0.020 mm
Clays	1.9%	0.005 mm
	1.3%	0.002 mm
Colloids	0.9%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sand

Comments:

Reviewed by: Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

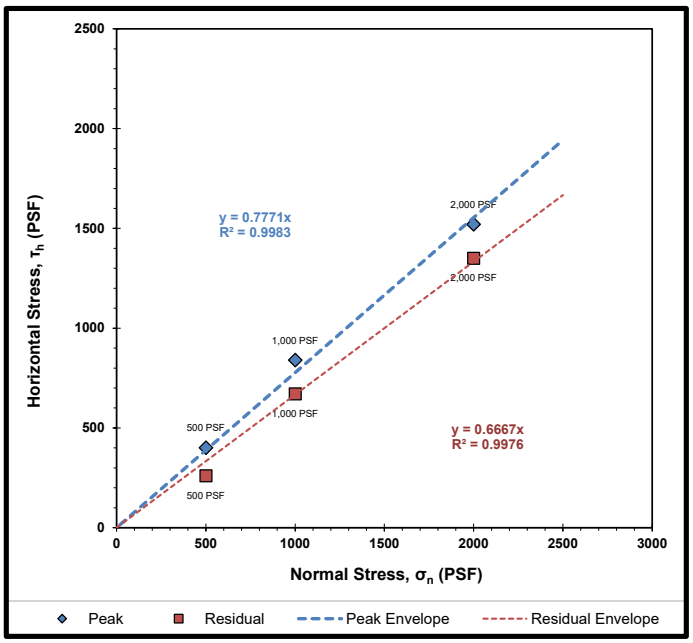
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT7-GB-8.5-18.5 ft
Laboratory Sample ID:	B21-1466	**Visual Soil Description:**	brown silty sand
Sample Date:	7/9/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/1/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	36.5	
	Initial	**Post-Consolidation**
Dry Density (PCF):	99.2	102.6
Void Ratio:	0.698	0.642
Porosity (%):	41.1	39.1
Degree of Saturation (%):	saturated	saturated

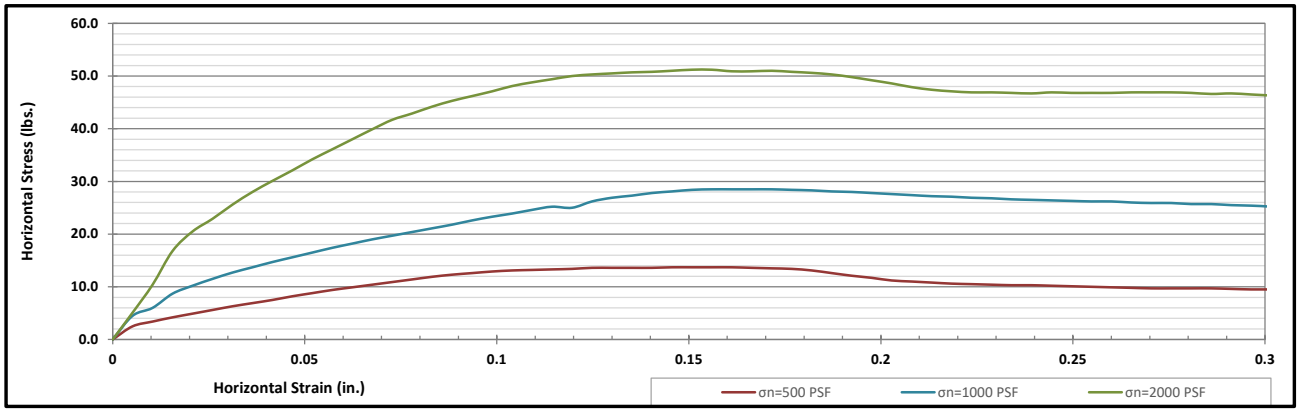
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	37.7	
	Initial	**Post-Consolidation**
Dry Density (PCF):	97.5	105.0
Void Ratio:	0.728	0.605
Porosity (%):	42.1	37.7
Degree of Saturation (%):	saturated	saturated

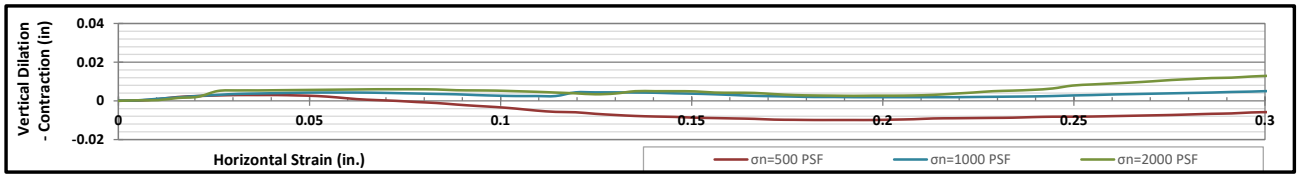
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	36.6	
	Initial	**Post-Consolidation**
Dry Density (PCF):	99.4	106.9
Void Ratio:	0.694	0.576
Porosity (%):	41.0	36.5
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**38**	**34**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	400	840	1520
Residual Horizontal Stress, τ_h (PSF):	260	670	1350





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Visit our website: www.mtc-inc.net

Client:	Anchor QEA	**Date:**	September 30, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-1535-1552
Revised on:		**Date sampled:**	July 9, 2021

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Date Received: July 29, 2021
Date Tested: September 1, 2021

Client: Anchor QEA
Sampled by: Client
Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1535	LDW21-GT7-GB-5.7-8.5 ft	220.0	955.7	691.6	264.1	471.6	56.0%
B21-1536	LDW21-GT7-GB-18.5-23.5 ft	233.7	1022.0	763.2	258.8	529.5	48.9%
B21-1537	LDW21-GT7-GB-23.5-25 ft	229.6	808.5	686.6	121.9	457.0	26.7%
B21-1538	LDW21-GT3-GB-0-1.5 ft	222.7	822.9	608.9	214.0	386.2	55.4%
B21-1539	LDW21-GT3-GB-0-8 ft	223.1	775.1	560.8	214.3	337.7	63.5%
B21-1540	LDW21-GT3-GB-8-9.5 ft	235.0	596.2	499.4	96.8	264.4	36.6%
B21-1541	LDW21-GT3-GB-13.6-18 ft	224.3	840.2	686.6	153.6	462.3	33.2%
B21-1542	LDW21-GT3-GB-18-19.5 ft	208.8	713.1	597.6	115.5	388.8	29.7%
B21-1543	LDW21-GT2-GB-0-1.5 ft	221.9	1015.5	706.7	308.8	484.8	63.7%
B21-1544	LDW21-GT2-GB-0-9 ft	221.9	1057.2	726.4	330.8	504.5	65.6%
B21-1545	LDW21-GT2-GB-9-10.5 ft	234.7	881.9	693.4	188.5	458.7	41.1%
B21-1546	LDW21-GT2-GB-16-19ft	319.9	776.4	594.5	181.9	274.6	66.2%
B21-1547	LDW21-GT1-GB-19-20.5 ft	268.9	932.1	798.3	133.8	529.4	25.3%
B21-1548	LDW21-GT1-GB-0-1.5 ft	270.2	991.8	734.1	257.7	463.9	55.6%
B21-1549	LDW21-GT1-GB-0-10 ft	266.5	951.7	694.7	257.0	428.2	60.0%
B21-1550	LDW21-GT1-GB-10-11.5 ft	303.8	1160.1	875.7	284.4	571.9	49.7%
B21-1551	LDW21-GT1-GB-10-20 ft	311.0	1013.9	756.9	257.0	445.9	57.6%
B21-1552	LDW21-GT1-GB-20-21.5 ft	306.5	1105.1	926.6	178.5	620.1	28.8%

Reviewed by: Meghan Blodgett-Carrillo

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: September 1, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-1536	LDW21-GT7-GB-18.5-23.5 ft	414.24	485.84	71.6	TSA-010	180.3	499.5	0.99752	753.80	709.46	23.1	2.6265591	0.99931	2.6247467
B21-1541	LDW21-GT3-GB-13.6-18 ft	379.79	481.87	102.1	TSA-011	190.3	499.5	0.99749	752.15	688.62	23.2	2.6482538	0.99929	2.6463735
B21-1546	LDW21-GT2-GB-16-19ft	417.55	468.99	51.4	TSA-017	187.9	499.4	0.99754	717.30	686.06	23.0	2.546361	0.99933	2.5446549
B21-1549	LDW21-GT1-GB-0-10 ft	411.71	488.70	77.0	TSA-022	198.0	499.5	0.99749	742.60	696.19	23.2	2.5179566	0.99929	2.5161689
B21-1551	LDW21-GT1-GB-10-20 ft	380.03	474.50	94.5	TSA-020	195.0	499.5	0.99749	750.48	693.27	23.2	2.5356867	0.99929	2.5338864

Reviewed by:
Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	1-Sep-21
Source:	LDW21-GT7-GB-5.7-8.5 ft	**Tested By:**	C. Kriss
Sample #:	B21-1535		

Visual Identification
Sand with Silt and Clay
Sample Color
brown

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	34.38	32.59	32.44			
Weight of Dry Soils + Pan:	30.26	28.85	28.70			
Weight of Pan:	19.58	19.73	19.89			
Weight of Dry Soils:	10.68	9.12	8.81			
Weight of Moisture:	4.12	3.74	3.74			
% Moisture:	38.6 %	41.0 %	42.5 %			
Number of Blows:	33	24	13			

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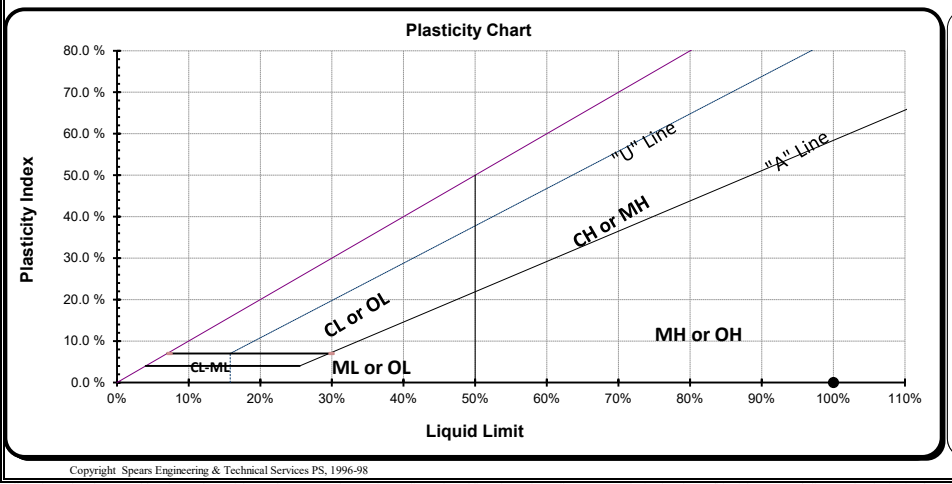
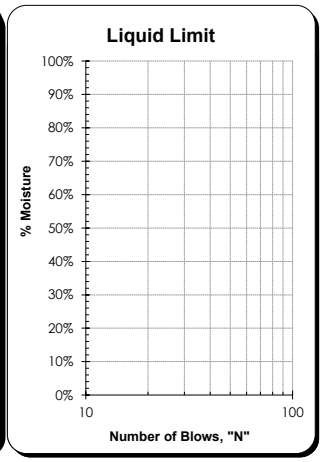
Certificate #: 1366.01

Liquid Limit @ 25 Blows: 40 %
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT7-GB-18.5-23.5 ft
Sample#: B21-1536

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 1-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

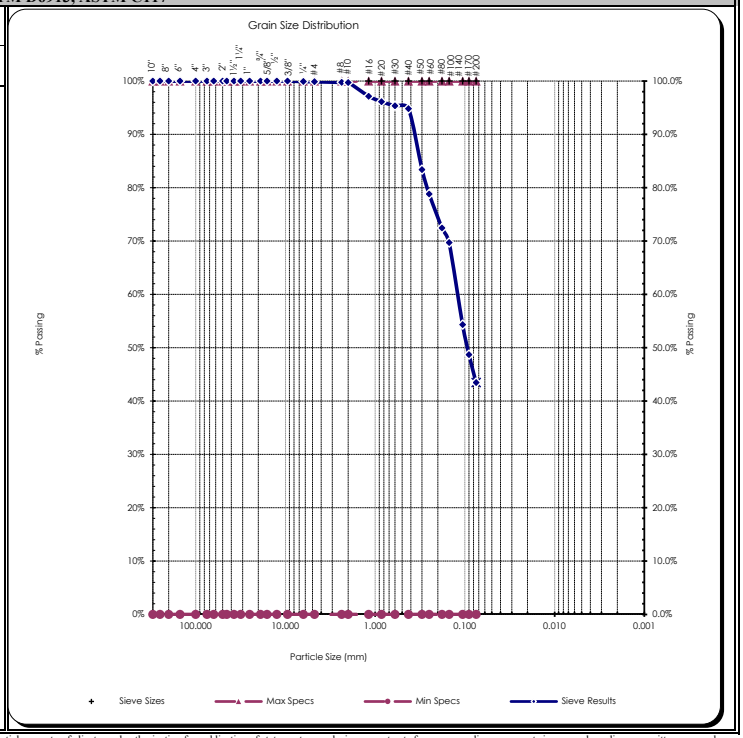
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.009	mm	% Gravel =	0.1%	Coeff. of Curvature, C_C = 1.27
$D_{(10)}$ =	0.017	mm	% Sand =	56.4%	Coeff. of Uniformity, C_U = 7.08
$D_{(15)}$ =	0.026	mm	% Silt & Clay =	43.5%	Fineness Modulus = 0.55
$D_{(30)}$ =	0.052	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.094	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 48.9%
$D_{(60)}$ =	0.122	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.372	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	11/24		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		97%	100.0%	0.0%
#20	0.850		96%	100.0%	0.0%
#30	0.600		95%	100.0%	0.0%
#40	0.425	95%	95%	100.0%	0.0%
#50	0.300		83%	100.0%	0.0%
#60	0.250		79%	100.0%	0.0%
#80	0.180		72%	100.0%	0.0%
#100	0.150	70%	70%	100.0%	0.0%
#140	0.106		54%	100.0%	0.0%
#170	0.090		49%	100.0%	0.0%
#200	0.075	43.5%	43.5%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21	**Visual Identification**	
Project #:	21B233	**Sampled By:**	Client	Sandy Silt	
Client:	Anchor QEA	**Date Tested:**	1-Sep-21	**Sample Color**	
Source:	LDW21-GT3-GB-0-8 ft	**Tested By:**	C. Kriss	brown	
Sample #:	B21-1539				

Liquid Limit Determination

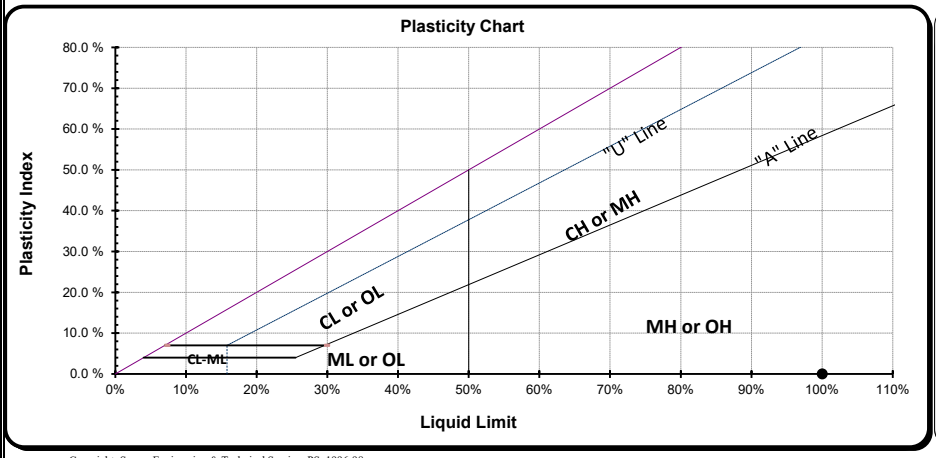
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Liquid limit cannot be established				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

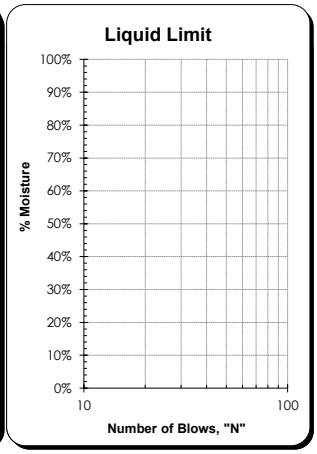
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Plastic limit cannot be determined				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT3-GB-8-9.5 ft
Sample#: B21-1540

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 1-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

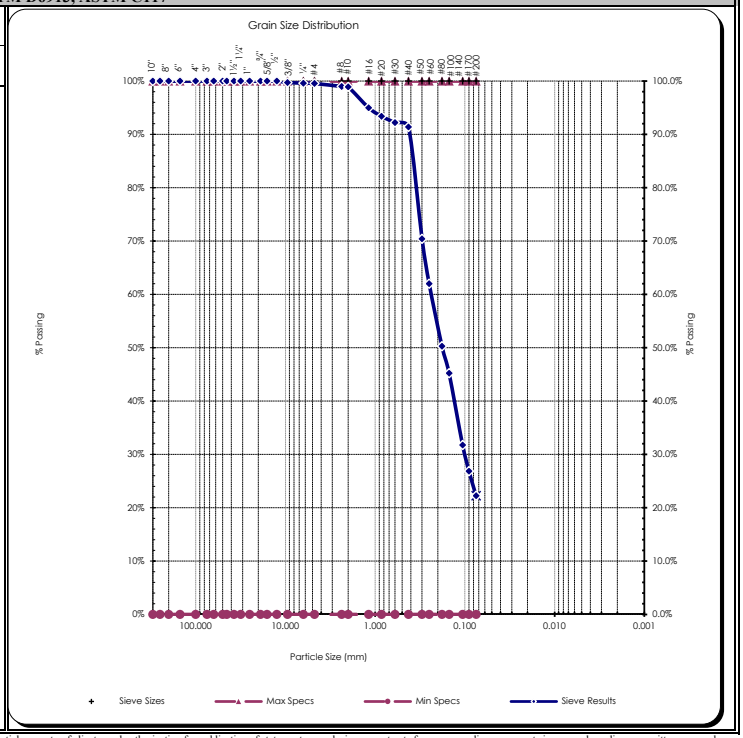
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.017	mm	% Gravel =	0.5%	Coeff. of Curvature, C_C = 1.25
$D_{(10)}$ =	0.034	mm	% Sand =	77.3%	Coeff. of Uniformity, C_U = 7.06
$D_{(15)}$ =	0.051	mm	% Silt & Clay =	22.3%	Fineness Modulus = 0.99
$D_{(30)}$ =	0.100	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.178	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 36.6%
$D_{(60)}$ =	0.238	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.417	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	19/78		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		95%	100.0%	0.0%
#20	0.850		93%	100.0%	0.0%
#30	0.600		92%	100.0%	0.0%
#40	0.425	91%	91%	100.0%	0.0%
#50	0.300		70%	100.0%	0.0%
#60	0.250		62%	100.0%	0.0%
#80	0.180		50%	100.0%	0.0%
#100	0.150	45%	45%	100.0%	0.0%
#140	0.106		32%	100.0%	0.0%
#170	0.090		27%	100.0%	0.0%
#200	0.075	22.3%	22.3%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

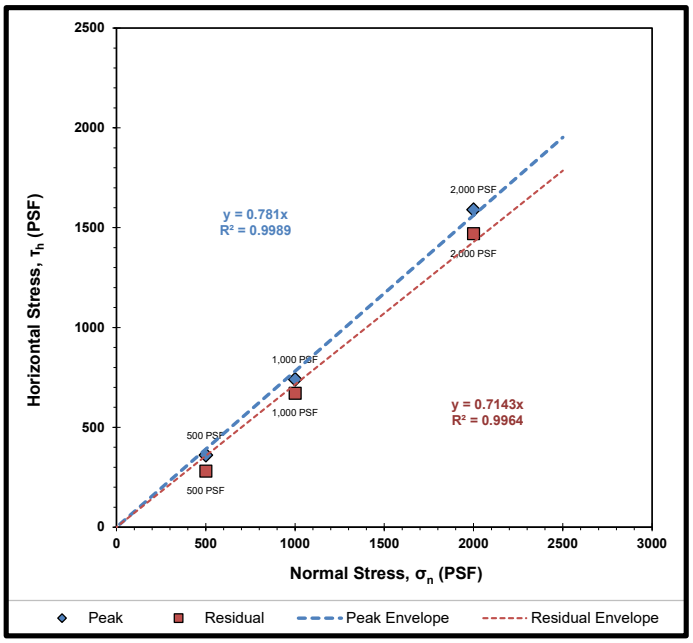
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT3-GB-8-9.5 ft
Laboratory Sample ID:	B21-1540	**Visual Soil Description:**	brown silty sand
Sample Date:	7/9/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/24/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	33.7	
	Initial	**Post-Consolidation**
Dry Density (PCF):	102.4	104.0
Void Ratio:	0.645	0.620
Porosity (%):	39.2	38.3
Degree of Saturation (%):	saturated	saturated

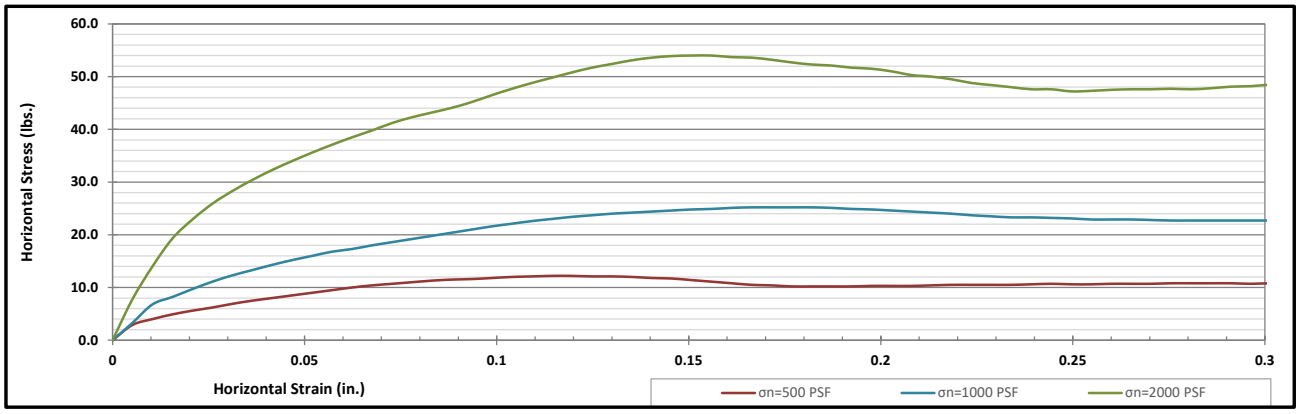
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	31.2	
	Initial	**Post-Consolidation**
Dry Density (PCF):	104.0	109.1
Void Ratio:	0.620	0.544
Porosity (%):	38.3	35.2
Degree of Saturation (%):	saturated	saturated

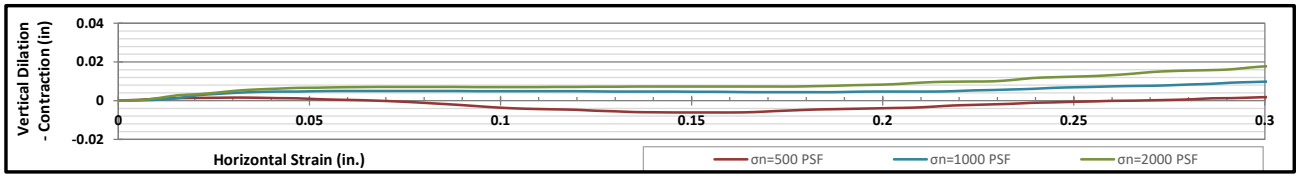
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	30.1	
	Initial	**Post-Consolidation**
Dry Density (PCF):	105.0	110.4
Void Ratio:	0.605	0.526
Porosity (%):	37.7	34.5
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**38**	**36**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	360	740	1590
Residual Horizontal Stress, τ_h (PSF):	280	670	1470





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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT3-GB-13.6-18 ft
Sample#: B21-1541

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 1-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

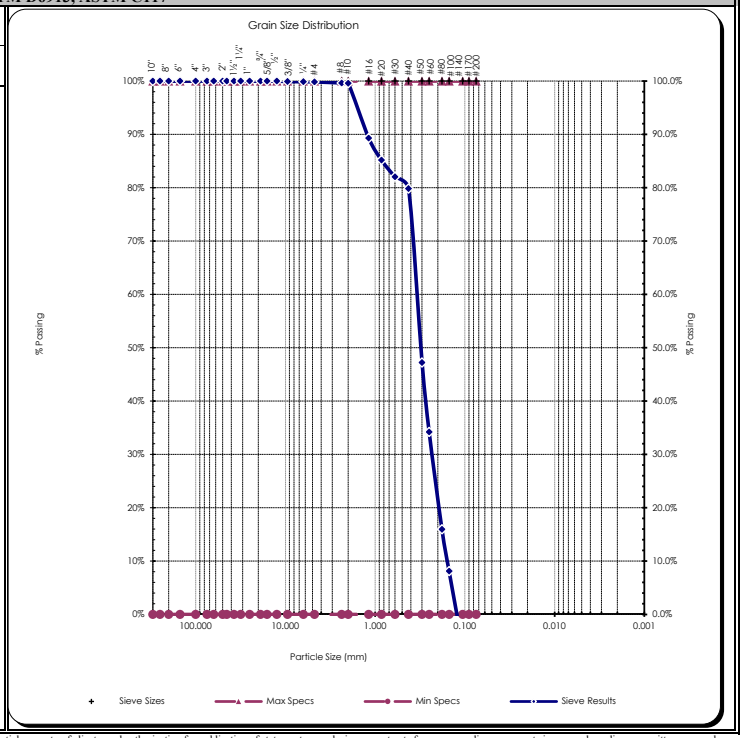
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.140	mm	% Gravel =	0.2%	Coeff. of Curvature, C_C =	1.00
$D_{(10)}$ =	0.157	mm	% Sand =	115.1%	Coeff. of Uniformity, C_U =	2.22
$D_{(15)}$ =	0.176	mm	% Silt & Clay =	-15.2%	Fineness Modulus =	1.74
$D_{(30)}$ =	0.234	mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.311	mm	Plasticity Index =	n/a	Moisture %, as sampled =	33.2%
$D_{(60)}$ =	0.349	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	1.234	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	- 17/89		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		89%	100.0%	0.0%
#20	0.850		85%	100.0%	0.0%
#30	0.600		82%	100.0%	0.0%
#40	0.425	80%	80%	100.0%	0.0%
#50	0.300		47%	100.0%	0.0%
#60	0.250		34%	100.0%	0.0%
#80	0.180		16%	100.0%	0.0%
#100	0.150	8%	8%	100.0%	0.0%
#140	0.106		-6%	100.0%	0.0%
#170	0.090		-11%	100.0%	0.0%
#200	0.075	-15.2%	-15.2%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21	**Visual Identification**	
Project #:	21B233	**Sampled By:**	Client	Sandy Silt	
Client:	Anchor QEA	**Date Tested:**	1-Sep-21	**Sample Color**	
Source:	LDW21-GT2-GB-0-9 ft	**Tested By:**	C. Kriss	brown	
Sample #:	B21-1544				

Liquid Limit Determination

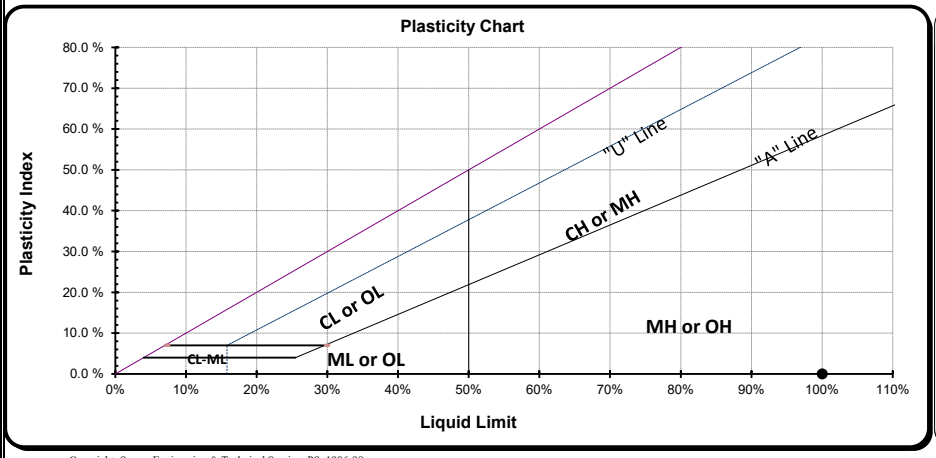
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Liquid limit cannot be established				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

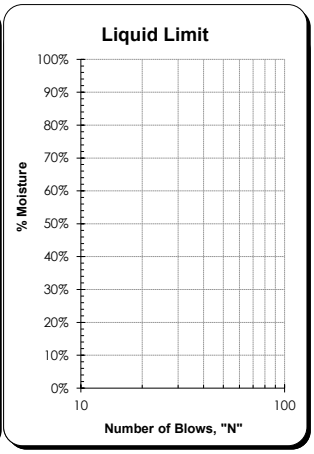
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows:	N/A
Plastic Limit:	N/A
Plasticity Index, I_P:	N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Plastic limit cannot be determined				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT2-GB-16-19 ft
Sample#: B21-1546

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 1-Sep-21
Tested By: C. Kriss

Visual Identification
Sandy Silt with Clay
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

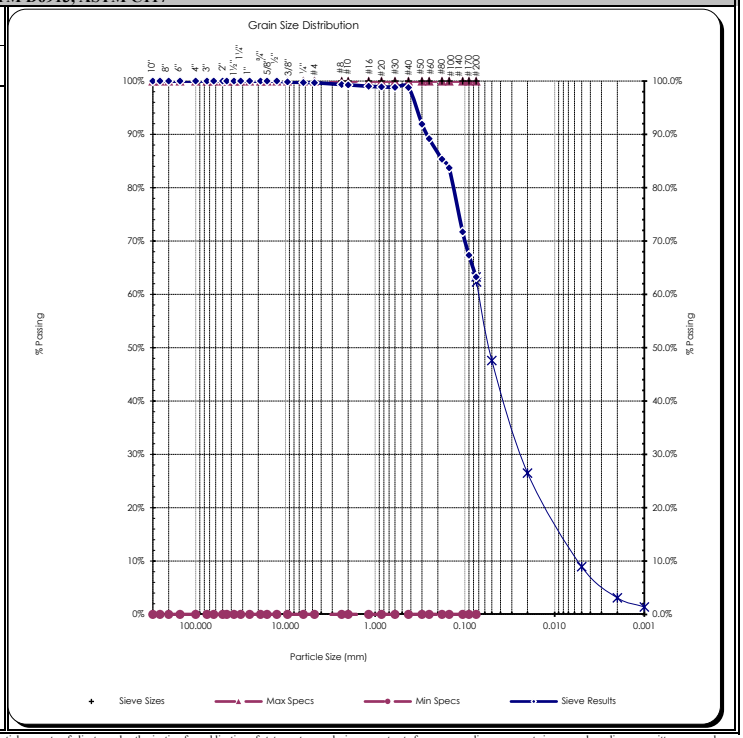
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.003	mm	% Gravel =	0.3%	Coeff. of Curvature, C_C =	1.57
$D_{(10)}$ =	0.006	mm	% Sand =	36.4%	Coeff. of Uniformity, C_U =	12.88
$D_{(15)}$ =	0.009	mm	% Silt & Clay =	63.3%	Fineness Modulus =	0.28
$D_{(30)}$ =	0.025	mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.061	mm	Plasticity Index =	n/a	Moisture %, as sampled =	66.2%
$D_{(60)}$ =	0.072	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	0.265	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	25/39		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		92%	100.0%	0.0%
#60	0.250		89%	100.0%	0.0%
#80	0.180		85%	100.0%	0.0%
#100	0.150	84%	84%	100.0%	0.0%
#140	0.106		72%	100.0%	0.0%
#170	0.090		67%	100.0%	0.0%
#200	0.075	63.3%	63.3%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	1-Sep-21
Source:	LDW21-GT2-GB-16-19 ft	**Tested By:**	C. Kriss
Sample#:	B21-1546		

Visual Identification
Sandy Silt with Clay
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr :	2.54	
Sample Weight:	75.85	grams
Hydroscopic Moist.:	6.24%	
Adj. Sample Wgt :	71.39	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	27	38.7%	0.0494 mm
2	23.5	33.7%	0.0358 mm
5	20.5	29.4%	0.0231 mm
15	14.5	20.8%	0.0138 mm
30	11.5	16.5%	0.0099 mm
60	9	12.9%	0.0071 mm
240	4.5	6.4%	0.0036 mm
1440	1.5	2.1%	0.0015 mm

% Gravel:	0.3%	**Liquid Limit:**	n/a
% Sand:	36.4%	**Plastic Limit:**	n/a
% Silt:	54.3%	**Plasticity Index:**	n/a
% Clay:	9.0%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	99%	2.000 mm
#20	99%	0.850 mm
#40	99%	0.425 mm
#100	84%	0.150 mm
#200	63.3%	0.075 mm
Silts	62.3%	0.074 mm
	47.6%	0.050 mm
	26.5%	0.020 mm
Clays	9.0%	0.005 mm
	3.1%	0.002 mm
Colloids	1.4%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sandy Loam

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

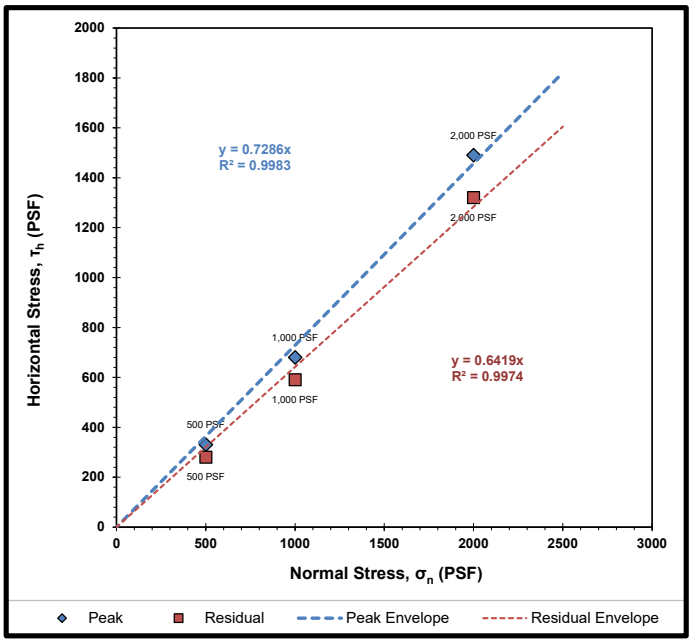
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT2-GB-16-19 ft
Laboratory Sample ID:	B21-1546	**Visual Soil Description:**	brown sandy silt
Sample Date:	7/9/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/27/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0042
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	38.6	
	Initial	**Post-Consolidation**
Dry Density (PCF):	100.0	106.5
Void Ratio:	0.684	0.581
Porosity (%):	40.6	36.8
Degree of Saturation (%):	saturated	saturated

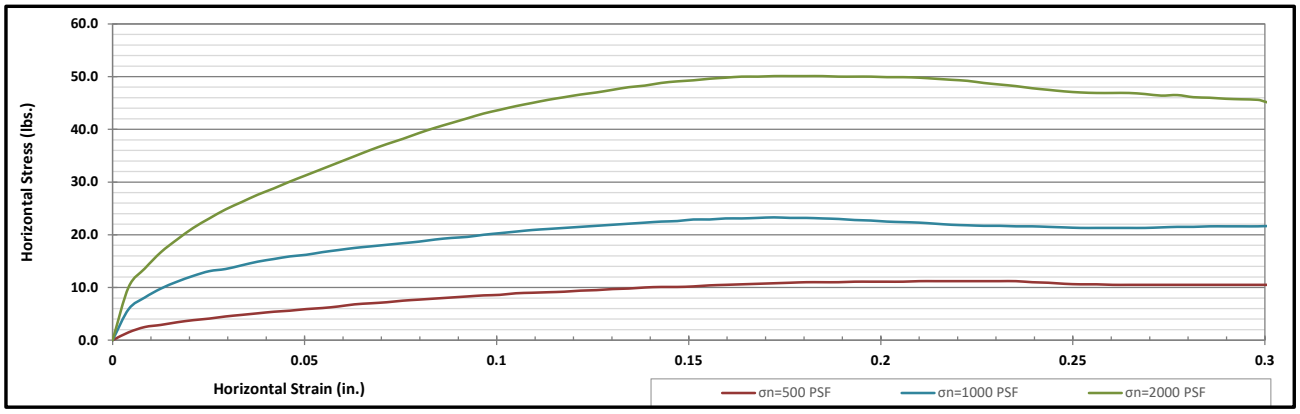
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	36.2	
	Initial	**Post-Consolidation**
Dry Density (PCF):	101.4	111.3
Void Ratio:	0.661	0.514
Porosity (%):	39.8	34.0
Degree of Saturation (%):	saturated	saturated

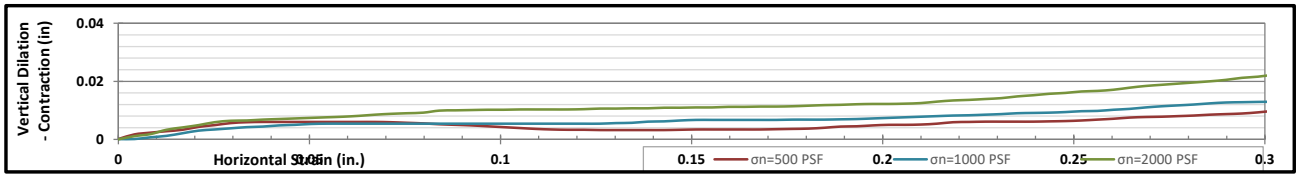
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	34.6	
	Initial	**Post-Consolidation**
Dry Density (PCF):	102.5	110.5
Void Ratio:	0.643	0.525
Porosity (%):	39.1	34.4
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**36**	**33**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	330	680	1490
Residual Horizontal Stress, τ_h (PSF):	280	590	1320





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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21	**Visual Identification**	
Project #:	21B233	**Sampled By:**	Client	Silty Sand	
Client:	Anchor QEA	**Date Tested:**	1-Sep-21	**Sample Color**	
Source:	LDW21-GT1-GB-0-10 ft	**Tested By:**	C. Kriss	brown	
Sample #:	B21-1549				

Liquid Limit Determination

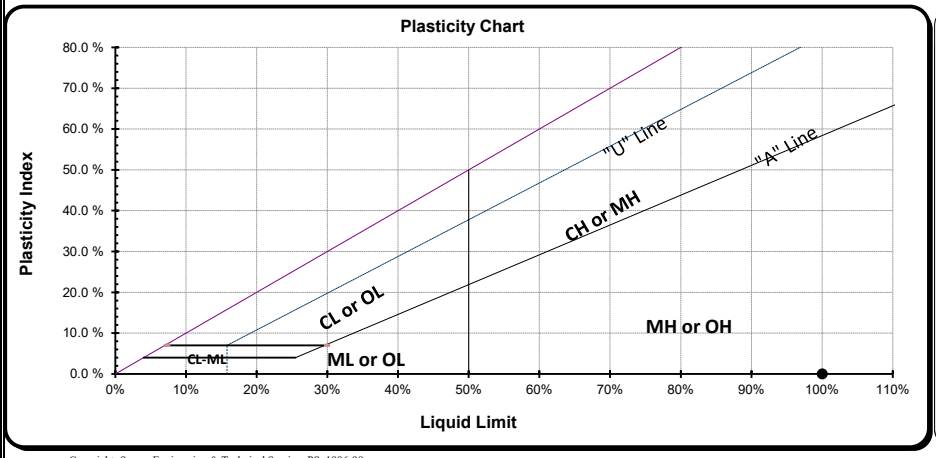
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Liquid limit cannot be established				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

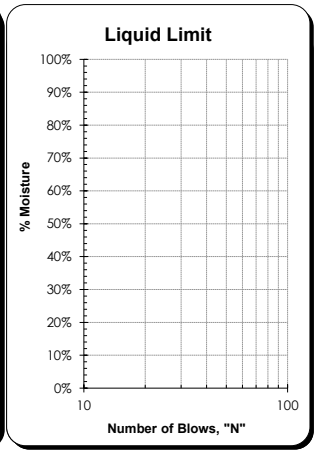
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Plastic limit cannot be determined				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT1-GB-10-20 ft
Sample#: B21-1551

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 1-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

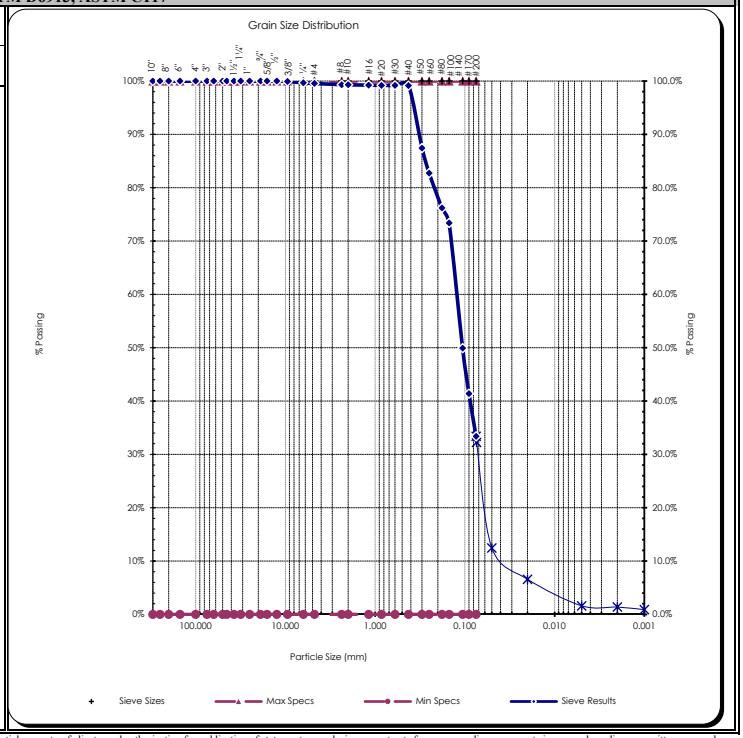
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.013	mm	% Gravel =	0.5%	Coeff. of Curvature, C_C = 1.11
$D_{(10)}$ =	0.037	mm	% Sand =	66.2%	Coeff. of Uniformity, C_U = 3.34
$D_{(15)}$ =	0.059	mm	% Silt & Clay =	33.4%	Fineness Modulus = 0.42
$D_{(30)}$ =	0.072	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.106	mm	Plasticity Index =	n/a	Moisture %, as sampled = 57.6%
$D_{(60)}$ =	0.125	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.327	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	33/98		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		87%	100.0%	0.0%
#60	0.250		83%	100.0%	0.0%
#80	0.180		76%	100.0%	0.0%
#100	0.150	73%	73%	100.0%	0.0%
#140	0.106		50%	100.0%	0.0%
#170	0.090		41%	100.0%	0.0%
#200	0.075	33.4%	33.4%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	1-Sep-21
Source:	LDW21-GT1-GB-10-20 ft	**Tested By:**	C. Kriss
Sample#:	B21-1551		

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr :	2.53	
Sample Weight:	75.48	grams
Hydroscopic Moist.:	2.34%	
Adj. Sample Wgt :	73.75	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	8	11.1%	0.0554 mm
2	7.5	10.4%	0.0394 mm
5	5.5	7.6%	0.0252 mm
15	4	5.5%	0.0146 mm
30	3	4.2%	0.0104 mm
60	1.5	2.1%	0.0074 mm
240	1	1.4%	0.0037 mm
1440	1	1.4%	0.0015 mm

% Gravel:	0.5%	**Liquid Limit:**	n/a
% Sand:	66.2%	**Plastic Limit:**	n/a
% Silt:	31.8%	**Plasticity Index:**	n/a
% Clay:	1.6%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	99%	2.000 mm
#20	99%	0.850 mm
#40	99%	0.425 mm
#100	73%	0.150 mm
#200	33.4%	0.075 mm
Silts	32.2%	0.074 mm
	12.5%	0.050 mm
	6.6%	0.020 mm
Clays	1.6%	0.005 mm
	1.4%	0.002 mm
Colloids	0.9%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sand

Comments:

Reviewed by: Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

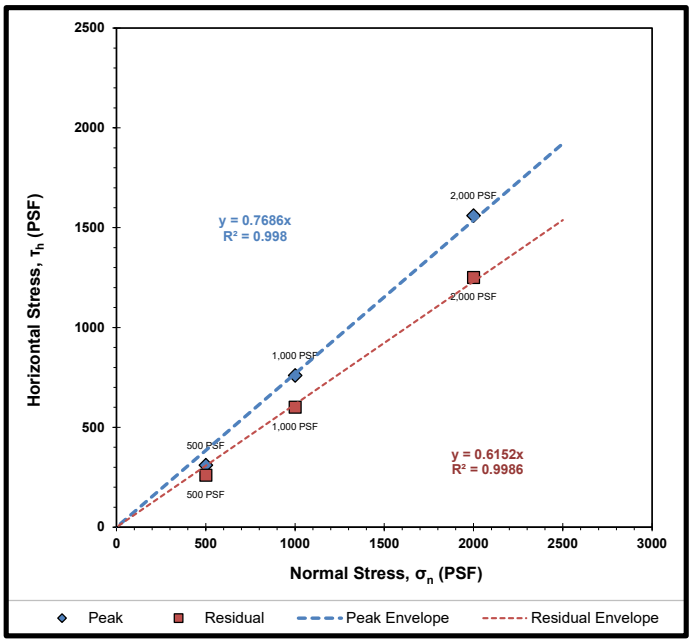
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT1-GB-10-20 ft
Laboratory Sample ID:	B21-1551	**Visual Soil Description:**	brown silty sand
Sample Date:	7/9/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/23/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	30.0	
	Initial	**Post-Consolidation**
Dry Density (PCF):	106.5	108.9
Void Ratio:	0.581	0.547
Porosity (%):	36.8	35.4
Degree of Saturation (%):	saturated	saturated

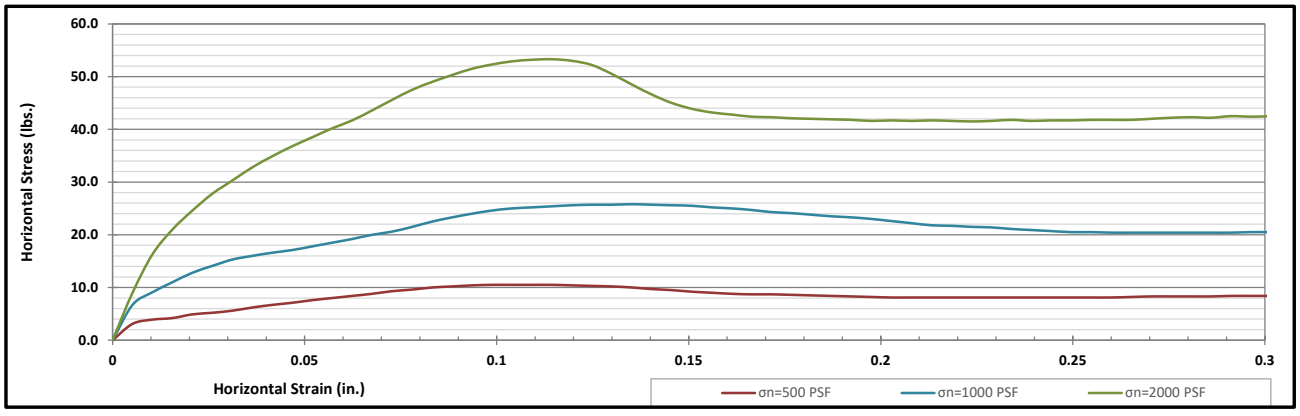
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	29.7	
	Initial	**Post-Consolidation**
Dry Density (PCF):	598.3	612.5
Void Ratio:	-0.718	-0.725
Porosity (%):	-255.1	-263.6
Degree of Saturation (%):	-111.5	saturated

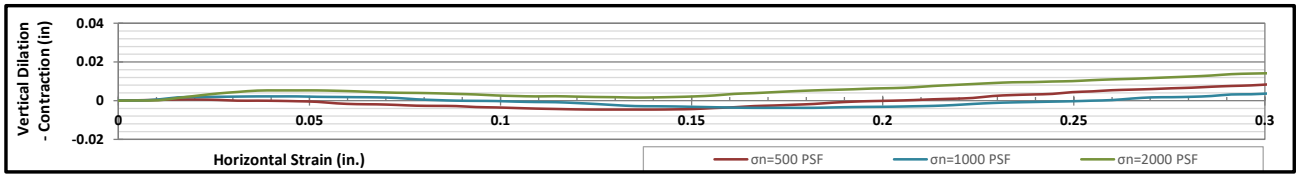
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	29.8	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.6	113.2
Void Ratio:	0.566	0.488
Porosity (%):	36.1	32.8
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**38**	**32**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	310	760	1560
Residual Horizontal Stress, τ_h (PSF):	260	600	1250





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Client:	Anchor QEA	**Date:**	October 1, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-1563-1577
Revised on:		**Date sampled:**	7-12-21 & 7-13-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Date Received: July 29, 2021
Date Tested: September 3, 2021

Client: Anchor QEA
Sampled by: Client
Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1563	LDW21-GT13-GB-0-1.5 ft	229.0	1015.9	773.9	242.0	544.9	44.4%
B21-1564	LDW21-GT13-GB-0-11 ft	221.0	537.3	449.8	87.5	228.8	38.2%
B21-1565	LDW21-GT13-GB-11-12.5 ft	217.1	1140.1	930.2	209.9	713.1	29.4%
B21-1566	LDW21-GT13-GB-11-21 ft	233.4	922.3	739.9	182.4	506.5	36.0%
B21-1567	LDW21-GT13-GB-21-22.5 ft	222.0	1231.9	1002.3	229.6	780.3	29.4%
B21-1568	LDW21-GT13-GB-21-31 ft	222.1	758.0	621.0	137.0	398.9	34.3%
B21-1569	LDW21-GT13-GB-31-32.5 ft	208.7	1100.3	893.6	206.7	684.9	30.2%
B21-1570	LDW21-GT19-GB-0-1.5 ft	234.8	863.2	678.6	184.6	443.8	41.6%
B21-1571	LDW21-GT19-GB-0-6.9 ft	222.1	761.3	524.7	236.6	302.6	78.2%
B21-1572	LDW21-GT19-GB-6.9-8.5 ft	233.1	1713.9	1391.1	322.8	1158.0	27.9%
B21-1573	LDW21-GT19-GB-8.5-10 ft	220.2	954.0	779.7	174.3	559.5	31.2%
B21-1574	LDW21-GT19-GB-8.5-18.5 ft	224.3	805.4	688.5	116.9	464.2	25.2%
B21-1575	LDW21-GT19-GB-18.5-20 ft	229.6	1121.9	927.8	194.1	698.2	27.8%
B21-1576	LDW21-GT19-GB-18.5-28.5 ft	215.7	1329.2	1088.0	241.2	872.3	27.7%
B21-1577	LDW21-GT19-GB-28.5-30 ft	225.2	725.0	616.3	108.7	391.1	27.8%

Reviewed by: Meghan Blodgett-Carrillo

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: September 1, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-1564	LDW21-GT13-GB-0-11 ft	378.85	431.72	52.9	TSA-016	197.2	499.5	0.99747	728.02	695.42	23.3	2.6087558	0.99926	2.6068253
B21-1568	LDW21-GT13-GB-21-31 ft	394.06	438.75	44.7	TSA-012	180.4	499.5	0.99752	706.18	678.65	23.1	2.6041054	0.99931	2.6023085
B21-1571	LDW21-GT19-GB-0-6.9 ft	429.62	462.35	32.7	TSA-014	192.3	499.5	0.99752	710.77	690.55	23.1	2.6160217	0.99931	2.6142167
B21-1574	LDW21-GT19-GB-8.5-18.5 ft	415.36	464.91	49.6	TSA-013	184.0	499.7	0.99754	712.79	682.43	23.0	2.5819681	0.99933	2.5802382

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT13-GB-0-11 ft
Sample#: B21-1564

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 1-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

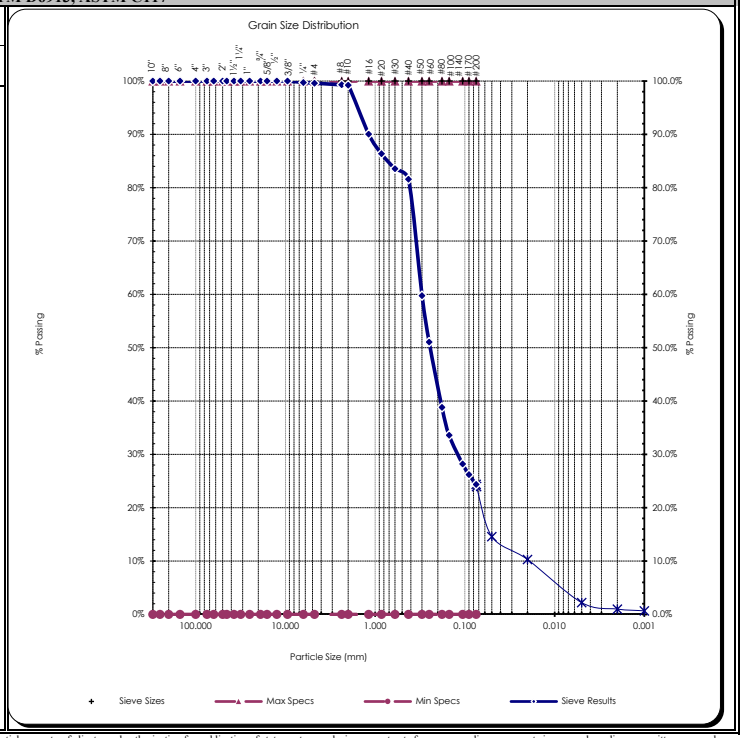
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.008	mm	% Gravel =	0.4%	Coeff. of Curvature, C_C = 2.52
$D_{(10)}$ =	0.019	mm	% Sand =	75.2%	Coeff. of Uniformity, C_U = 15.71
$D_{(15)}$ =	0.053	mm	% Silt & Clay =	24.4%	Fineness Modulus = 1.34
$D_{(30)}$ =	0.121	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.244	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 38.2%
$D_{(60)}$ =	0.301	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.175	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	26/87		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		90%	100.0%	0.0%
#20	0.850		86%	100.0%	0.0%
#30	0.600		84%	100.0%	0.0%
#40	0.425	82%	82%	100.0%	0.0%
#50	0.300		60%	100.0%	0.0%
#60	0.250		51%	100.0%	0.0%
#80	0.180		39%	100.0%	0.0%
#100	0.150	34%	34%	100.0%	0.0%
#140	0.106		28%	100.0%	0.0%
#170	0.090		26%	100.0%	0.0%
#200	0.075	24.4%	24.4%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	1-Sep-21
Source:	LDW21-GT13-GB-0-11 ft	**Tested By:**	C. Kriss
Sample#:	B21-1564		

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr :	2.61	
Sample Weight:	100.15	grams
Hydroscopic Moist.:	0.83%	
Adj. Sample Wgt :	99.33	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	14.5	14.6%	0.0519 mm
2	13	13.1%	0.0369 mm
5	11.5	11.6%	0.0236 mm
15	8	8.1%	0.0139 mm
30	6.5	6.6%	0.0099 mm
60	4	4.0%	0.0071 mm
240	1	1.0%	0.0036 mm
1440	1	1.0%	0.0015 mm

% Gravel:	0.4%	**Liquid Limit:**	0.0 %
% Sand:	75.2%	**Plastic Limit:**	0.0 %
% Silt:	22.2%	**Plasticity Index:**	0.0 %
% Clay:	2.2%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	99%	2.000 mm
#20	86%	0.850 mm
#40	82%	0.425 mm
#100	34%	0.150 mm
#200	24.4%	0.075 mm
Silts	24.0%	0.074 mm
	14.6%	0.050 mm
	10.3%	0.020 mm
Clays	2.2%	0.005 mm
	1.0%	0.002 mm
Colloids	0.7%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Loamy Sand

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

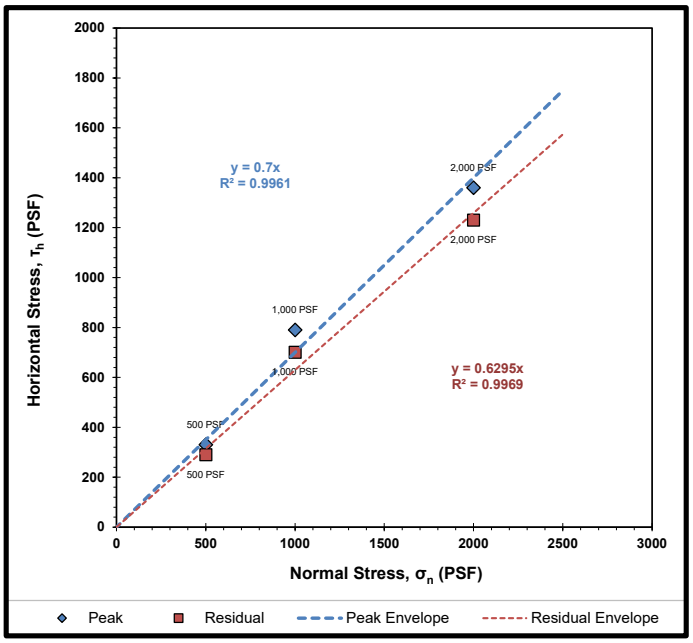
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT13-GB-0-11 ft
Laboratory Sample ID:	B21-1564	**Visual Soil Description:**	brown sand with silt
Sample Date:	7/12/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/20/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		**σ_n=500 PSF**
Initial Moisture Content (%):	32.6	
	Initial	**Post-Consolidation**
Dry Density (PCF):	104.7	106.1
Void Ratio:	0.608	0.589
Porosity (%):	37.8	37.0
Degree of Saturation (%):	saturated	saturated

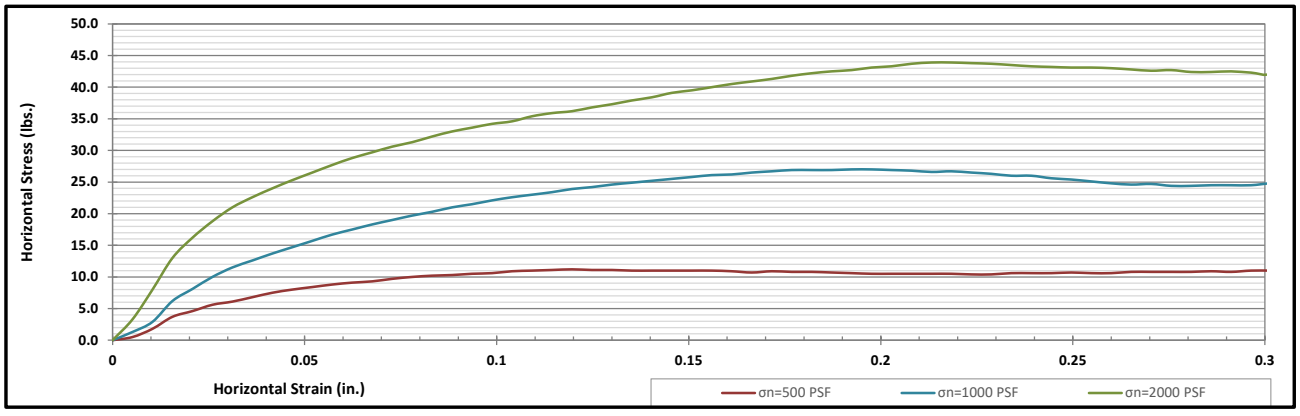
Summary of Sample Data:		**σ_n=1000 PSF**
Initial Moisture Content (%):	30.5	
	Initial	**Post-Consolidation**
Dry Density (PCF):	105.5	108.0
Void Ratio:	0.597	0.560
Porosity (%):	37.4	35.9
Degree of Saturation (%):	saturated	saturated

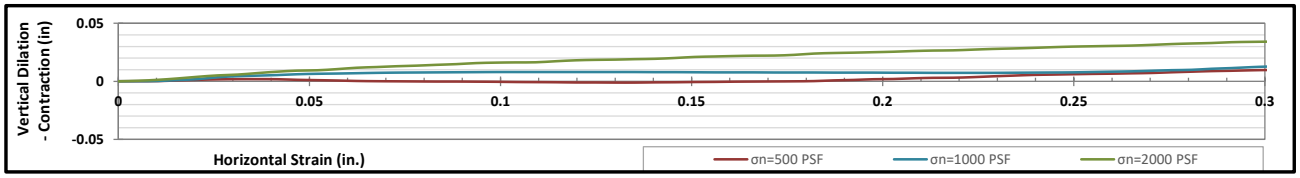
Summary of Sample Data:		**σ_n=2000 PSF**
Initial Moisture Content (%):	31.4	
	Initial	**Post-Consolidation**
Dry Density (PCF):	105.7	113.8
Void Ratio:	0.595	0.481
Porosity (%):	37.3	32.5
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS		
	PEAK	**RESIDUAL**
Angle of Internal Friction, ϕ (°):	**35**	**32**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	330	790	1360
Residual Horizontal Stress, τ_h (PSF):	290	700	1230





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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT13-GB-11-21 ft
Sample#: B21-1566

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 1-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

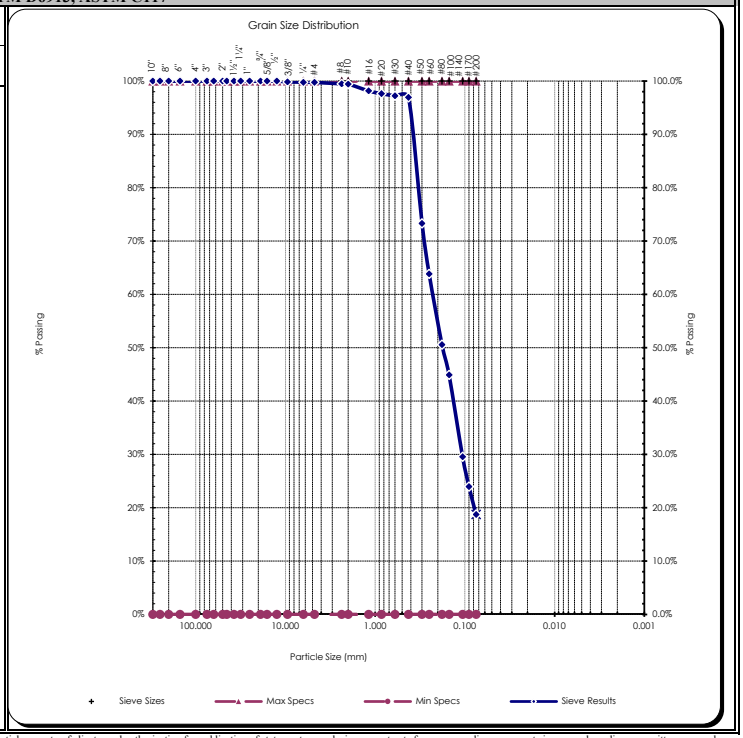
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.020	mm	% Gravel =	0.3%	Coeff. of Curvature, C_C = 1.25
$D_{(10)}$ =	0.040	mm	% Sand =	81.0%	Coeff. of Uniformity, C_U = 5.74
$D_{(15)}$ =	0.060	mm	% Silt & Clay =	18.7%	Fineness Modulus = 0.87
$D_{(30)}$ =	0.107	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.177	mm	Plasticity Index =	n/a	Moisture %, as sampled = 36.0%
$D_{(60)}$ =	0.230	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.388	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	17/88		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		98%	100.0%	0.0%
#20	0.850		98%	100.0%	0.0%
#30	0.600		97%	100.0%	0.0%
#40	0.425	97%	97%	100.0%	0.0%
#50	0.300		73%	100.0%	0.0%
#60	0.250		64%	100.0%	0.0%
#80	0.180		51%	100.0%	0.0%
#100	0.150	45%	45%	100.0%	0.0%
#140	0.106		30%	100.0%	0.0%
#170	0.090		24%	100.0%	0.0%
#200	0.075	18.7%	18.7%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT13-GB-21-31 ft
Sample#: B21-1568

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 1-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

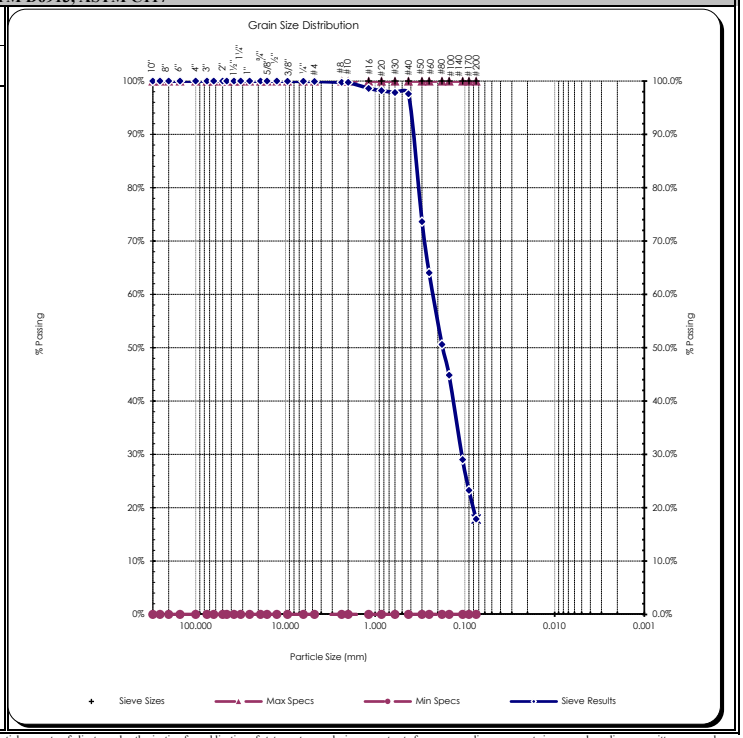
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.021	mm	% Gravel =	0.1%	Coeff. of Curvature, C_C = 1.23
$D_{(10)}$ =	0.042	mm	% Sand =	82.1%	Coeff. of Uniformity, C_U = 5.46
$D_{(15)}$ =	0.063	mm	% Silt & Clay =	17.9%	Fineness Modulus = 0.85
$D_{(30)}$ =	0.109	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.177	mm	Plasticity Index =	n/a	Moisture %, as sampled = 34.3%
$D_{(60)}$ =	0.229	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.385	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	13/71		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850		98%	100.0%	0.0%
#30	0.600		98%	100.0%	0.0%
#40	0.425	98%	98%	100.0%	0.0%
#50	0.300		74%	100.0%	0.0%
#60	0.250		64%	100.0%	0.0%
#80	0.180		51%	100.0%	0.0%
#100	0.150	45%	45%	100.0%	0.0%
#140	0.106		29%	100.0%	0.0%
#170	0.090		23%	100.0%	0.0%
#200	0.075	17.9%	17.9%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT19-GB-0-6.9 ft
Sample#: B21-1571

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 1-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
ML, Silt with Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

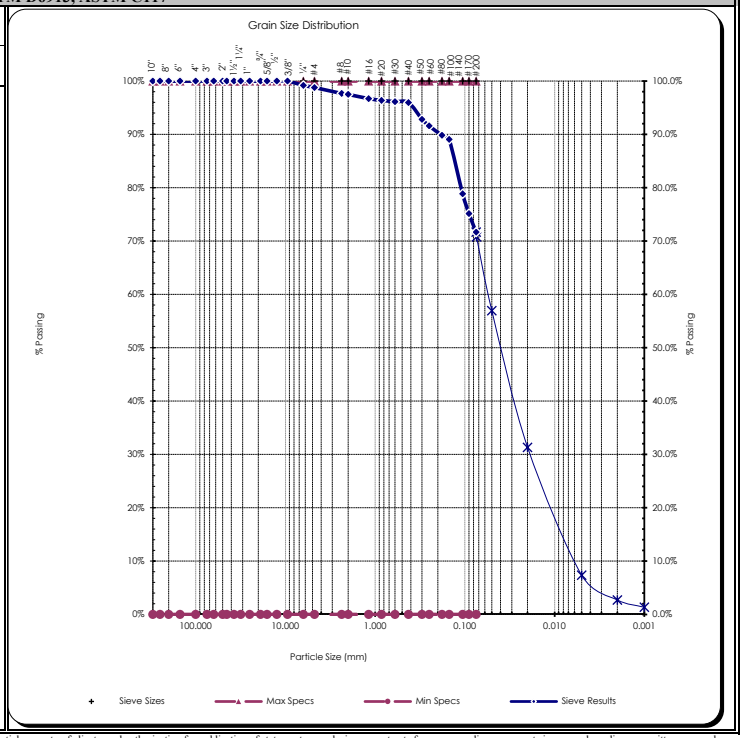
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.004	mm	% Gravel =	1.2%	Coeff. of Curvature, C_C = 0.88
$D_{(10)}$ =	0.007	mm	% Sand =	27.1%	Coeff. of Uniformity, C_U = 9.46
$D_{(15)}$ =	0.009	mm	% Silt & Clay =	71.7%	Fineness Modulus = 0.29
$D_{(30)}$ =	0.019	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.051	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 78.2%
$D_{(60)}$ =	0.062	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.186	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	59/79		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	98%	98%	100.0%	0.0%
#16	1.18		97%	100.0%	0.0%
#20	0.850		96%	100.0%	0.0%
#30	0.600		96%	100.0%	0.0%
#40	0.425	96%	96%	100.0%	0.0%
#50	0.300		93%	100.0%	0.0%
#60	0.250		92%	100.0%	0.0%
#80	0.180		90%	100.0%	0.0%
#100	0.150	89%	89%	100.0%	0.0%
#140	0.106		79%	100.0%	0.0%
#170	0.090		75%	100.0%	0.0%
#200	0.075	71.7%	71.7%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	1-Sep-21
Source:	LDW21-GT19-GB-0-6.9 ft	**Tested By:**	C. Kriss
Sample#:	B21-1571		

Unified Soil Classification System, ASTM-2487
ML, Silt with Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr :	2.61	
Sample Weight:	50.97	grams
Hydroscopic Moist.:	2.35%	
Adj. Sample Wgt :	49.80	grams

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Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	24.5	48.4%	0.0488 mm
2	19.5	38.6%	0.0356 mm
5	17.5	34.6%	0.0228 mm
15	12	23.7%	0.0135 mm
30	9	17.8%	0.0097 mm
60	5.5	10.9%	0.0070 mm
240	2.5	4.9%	0.0036 mm
1440	1	2.0%	0.0015 mm

% Gravel:	1.2%	**Liquid Limit:**	0.0 %
% Sand:	27.1%	**Plastic Limit:**	0.0 %
% Silt:	64.3%	**Plasticity Index:**	0.0 %
% Clay:	7.4%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	99%	6.300 mm
#4	99%	4.750 mm
#10	98%	2.000 mm
#20	96%	0.850 mm
#40	96%	0.425 mm
#100	89%	0.150 mm
#200	71.7%	0.075 mm
Silts	70.8%	0.074 mm
	56.9%	0.050 mm
	31.3%	0.020 mm
Clays	7.4%	0.005 mm
	2.7%	0.002 mm
Colloids	1.3%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Silt Loam

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	1-Sep-21
Source:	LDW21-GT19-GB-0-6.9 ft	**Tested By:**	C. Kriss
Sample #:	B21-1571		

Unified Soils Classification System, ASTM D-2487
ML, Silt with Sand
Sample Color
brown

Liquid Limit Determination

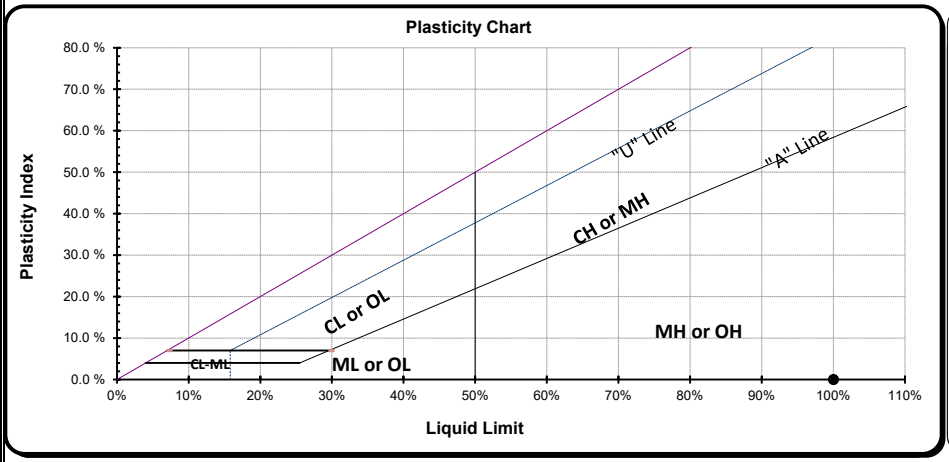
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Liquid limit cannot be established					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

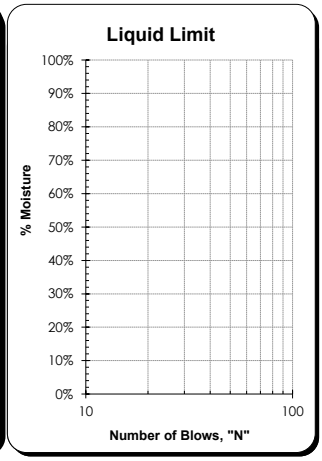
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT19-GB-6.9-8.5 ft
Sample#: B21-1572

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 1-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

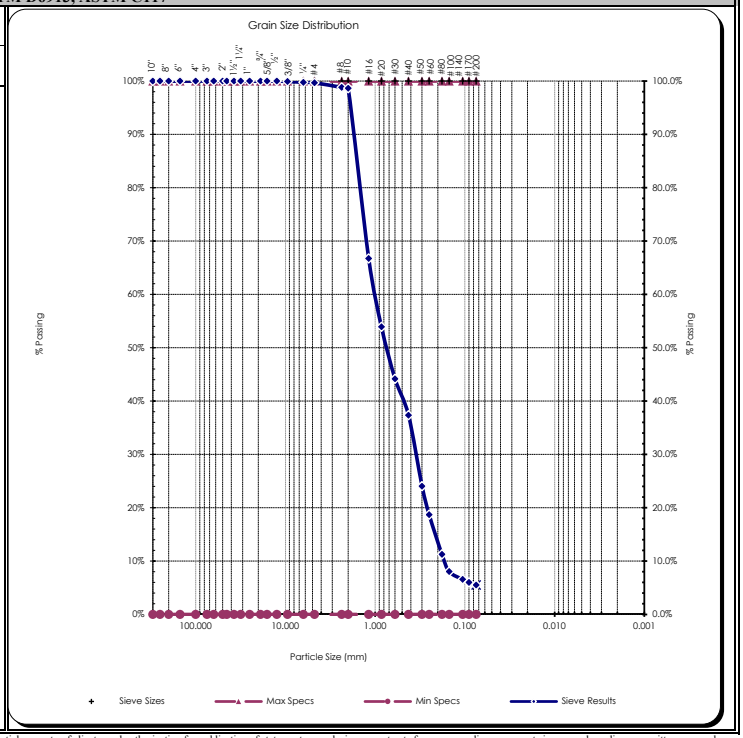
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.068	mm	% Gravel =	0.3%	Coeff. of Curvature, C_C = 0.75
$D_{(10)}$ =	0.168	mm	% Sand =	94.2%	Coeff. of Uniformity, C_U = 5.98
$D_{(15)}$ =	0.215	mm	% Silt & Clay =	5.5%	Fineness Modulus = 2.59
$D_{(30)}$ =	0.356	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.749	mm	Plasticity Index =	n/a	Moisture %, as sampled = 27.9%
$D_{(60)}$ =	1.006	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.777	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	9/61		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		67%	100.0%	0.0%
#20	0.850		54%	100.0%	0.0%
#30	0.600		44%	100.0%	0.0%
#40	0.425	37%	37%	100.0%	0.0%
#50	0.300		24%	100.0%	0.0%
#60	0.250		19%	100.0%	0.0%
#80	0.180		11%	100.0%	0.0%
#100	0.150	8%	8%	100.0%	0.0%
#140	0.106		7%	100.0%	0.0%
#170	0.090		6%	100.0%	0.0%
#200	0.075	5.5%	5.5%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT19-GB-8.5-18.5 ft
Sample#: B21-1574

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 1-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

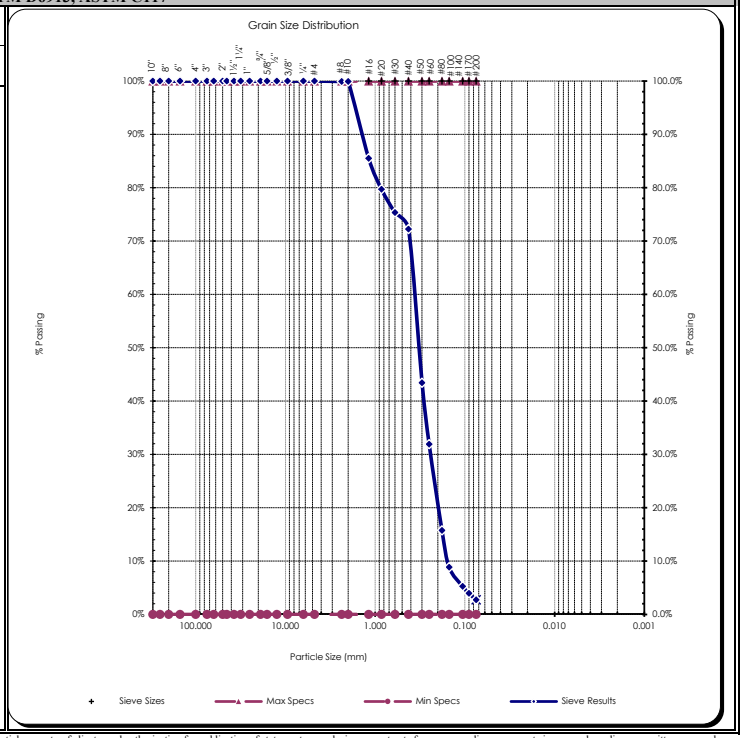
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.103	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.01
$D_{(10)}$ =	0.155	mm	% Sand =	97.3%	Coeff. of Uniformity, C_U = 2.40
$D_{(15)}$ =	0.177	mm	% Silt & Clay =	2.7%	Fineness Modulus = 1.87
$D_{(30)}$ =	0.242	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.328	mm	Plasticity Index =	n/a	Moisture %, as sampled = 25.2%
$D_{(60)}$ =	0.372	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.435	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	2/53		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		86%	100.0%	0.0%
#20	0.850		80%	100.0%	0.0%
#30	0.600		75%	100.0%	0.0%
#40	0.425	72%	72%	100.0%	0.0%
#50	0.300		43%	100.0%	0.0%
#60	0.250		32%	100.0%	0.0%
#80	0.180		16%	100.0%	0.0%
#100	0.150	9%	9%	100.0%	0.0%
#140	0.106		5%	100.0%	0.0%
#170	0.090		4%	100.0%	0.0%
#200	0.075	2.7%	2.7%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

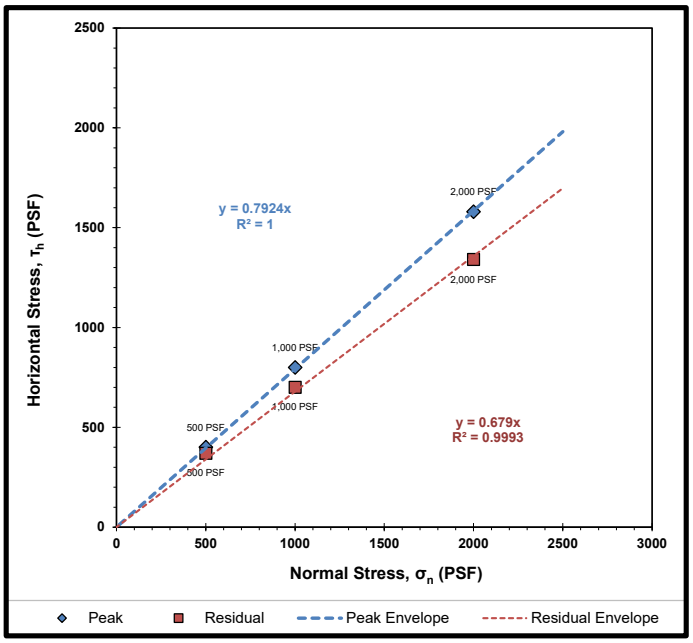
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT19-GB-8.5-18.5 ft
Laboratory Sample ID:	B21-1574	**Visual Soil Description:**	brown sand with silt
Sample Date:	7/13/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/21/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	27.5	
	Initial	**Post-Consolidation**
Dry Density (PCF):	106.2	107.3
Void Ratio:	0.586	0.570
Porosity (%):	37.0	36.3
Degree of Saturation (%):	saturated	saturated

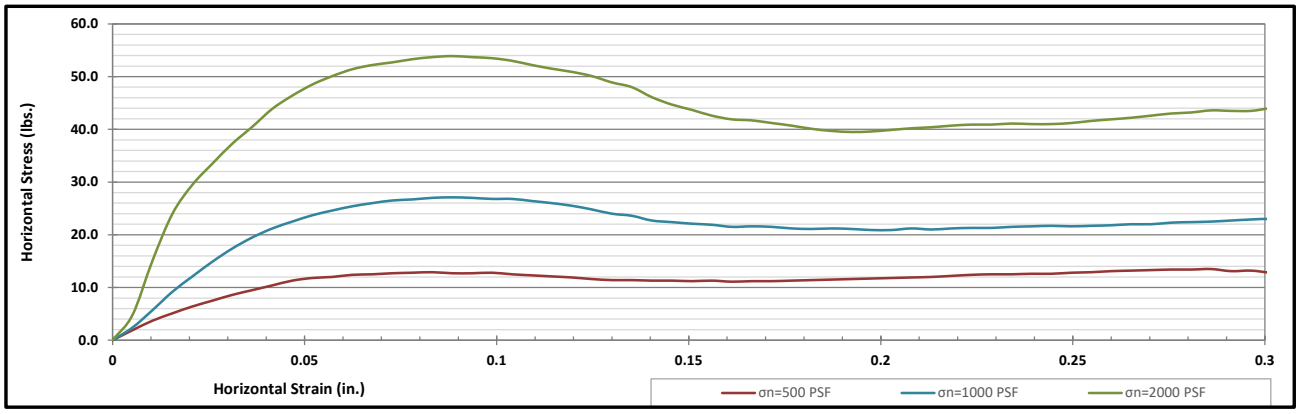
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	26.1	
	Initial	**Post-Consolidation**
Dry Density (PCF):	108.0	109.7
Void Ratio:	0.560	0.536
Porosity (%):	35.9	34.9
Degree of Saturation (%):	saturated	saturated

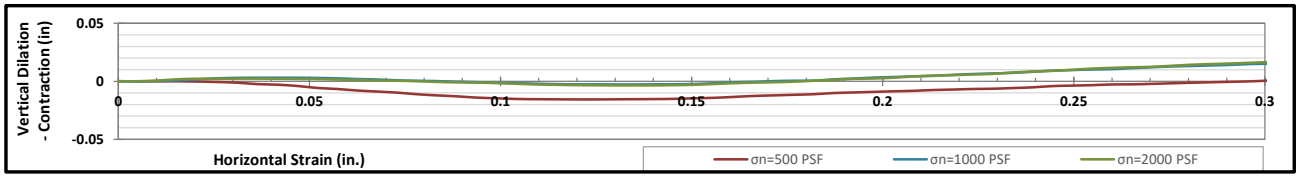
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	24.7	
	Initial	**Post-Consolidation**
Dry Density (PCF):	109.2	111.5
Void Ratio:	0.543	0.511
Porosity (%):	35.2	33.8
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**38**	**34**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	400	800	1580
Residual Horizontal Stress, τ_h (PSF):	370	700	1340





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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT19-GB-18.5-28.5 ft
Sample#: B21-1576

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 1-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

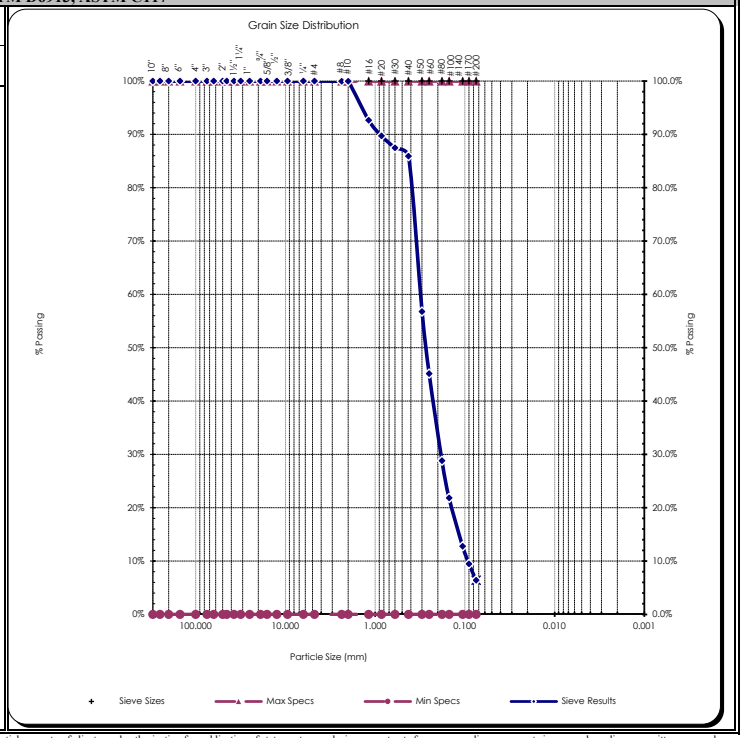
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.058	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.18
$D_{(10)}$ =	0.092	mm	% Sand =	93.6%	Coeff. of Uniformity, C_U = 3.40
$D_{(15)}$ =	0.117	mm	% Silt & Clay =	6.4%	Fineness Modulus = 1.41
$D_{(30)}$ =	0.185	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.271	mm	Plasticity Index =	n/a	Moisture %, as sampled = 27.7%
$D_{(60)}$ =	0.314	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.882	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	5/67		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		93%	100.0%	0.0%
#20	0.850		90%	100.0%	0.0%
#30	0.600		87%	100.0%	0.0%
#40	0.425	86%	86%	100.0%	0.0%
#50	0.300		57%	100.0%	0.0%
#60	0.250		45%	100.0%	0.0%
#80	0.180		29%	100.0%	0.0%
#100	0.150	22%	22%	100.0%	0.0%
#140	0.106		13%	100.0%	0.0%
#170	0.090		10%	100.0%	0.0%
#200	0.075	6.4%	6.4%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Client:	Anchor QEA	**Date:**	October 5, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-1693-1706
Revised on:		**Date sampled:**	July 14, 2021

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Date Received: July 29, 2021
Date Tested: September 13, 2021

Client: Anchor QEA
Sampled by: Client
Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1693	LDW21-GT37-GB-0-1.5 ft	233.7	583.3	440.8	142.5	207.1	68.8%
B21-1694	LDW21-GT37-GB-10-11.5 ft	302.0	688.9	534.6	154.3	232.6	66.3%
B21-1695	LDW21-GT37-GB-10-20 ft	234.3	678.9	534.1	144.8	299.8	48.3%
B21-1696	LDW21-GT37-GB-20-21.5 ft	341.8	864.9	644.8	220.1	303.0	72.6%
B21-1697	LDW21-GT37-GB-20-30 ft	316.0	945.0	766.3	178.7	450.3	39.7%
B21-1698	LDW21-GT37-GB-30-31.5 ft	346.9	1041.2	892.0	149.2	545.1	27.4%
B21-1699	LDW21-GT18-GB-0-1.5 ft	360.3	577.1	507.3	69.8	147.0	47.5%
B21-1700	LDW21-GT18-GB-0-6.5 ft	233.5	726.8	590.5	136.3	357.0	38.2%
B21-1701	LDW21-GT18-GB-6.5-8 ft	357.0	752.8	656.6	96.2	299.6	32.1%
B21-1702	LDW21-GT18-GB-6.5-16.5 ft	217.3	795.2	684.7	110.5	467.4	23.6%
B21-1703	LDW21-GT18-GB-16.5-18 ft	354.3	1016.0	893.3	122.7	539.0	22.8%
B21-1704	LDW21-GT18-GB-16.5-21.4 ft	10.2	159.2	118.5	40.7	108.3	37.6%
B21-1705	LDW21-GT18-GB-21.4-26.5 ft	690.5	1366.5	1179.1	187.4	488.6	38.4%
B21-1706	LDW21-GT18-GB-26.5-28 ft	359.5	929.9	801.2	128.7	441.7	29.1%

Reviewed by: Meghan Blodgett-Carrillo

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: September 13, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-1695	LDW21-GT37-GB-10-20 ft	493.21	568.13	74.9	TSA-013	184.0	499.7	0.99756	728.81	682.44	22.9	2.6240964	0.99936	2.6224169
B21-1697	LDW21-GT37-GB-20-30 ft	497.94	575.45	77.5	TSA-011	190.3	499.5	0.99752	736.61	688.63	23.1	2.624687	0.99931	2.6228759
B21-1700	LDW21-GT18-GB-0-6.5 ft	600.24	700.15	99.9	TSA-020	195.0	499.5	0.99752	753.52	693.28	23.1	2.5184539	0.99931	2.5167161
B21-1702	LDW21-GT18-GB-6.5-16.5 ft	510.32	612.20	101.9	TSA-010	180.3	499.5	0.99754	742.28	678.62	23.0	2.6655395	0.99933	2.6637535
B21-1705	LDW21-GT18-GB-21.4-26.5 ft	501.27	576.59	75.3	TSA-021	183.4	499.4	0.99745	727.11	681.56	23.4	2.5303609	0.99924	2.5284379

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT37-GB-10-20 ft
Sample#: B21-1695

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 13-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

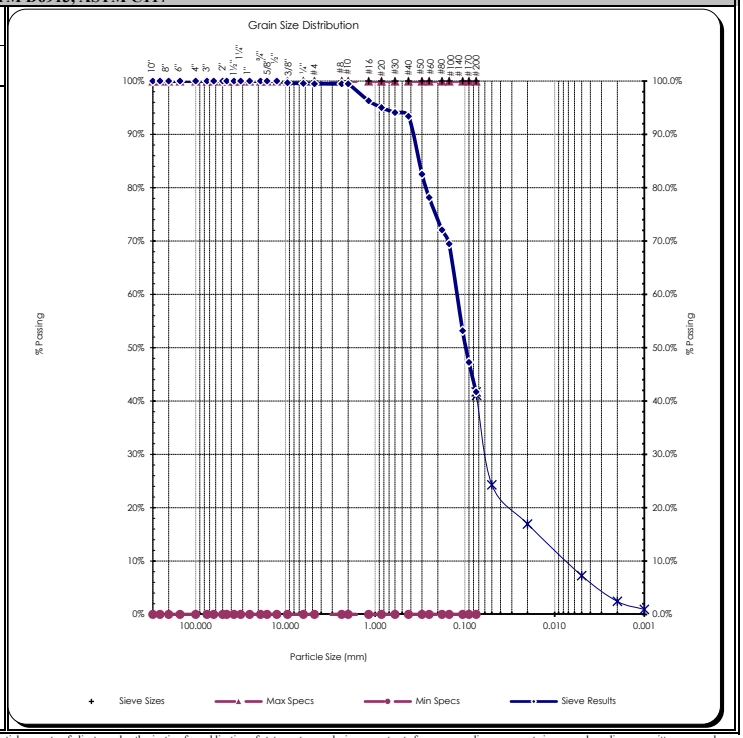
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.003	mm	% Gravel =	0.5%	Coeff. of Curvature, C_C =	3.61
$D_{(10)}$ =	0.007	mm	% Sand =	57.8%	Coeff. of Uniformity, C_U =	17.03
$D_{(15)}$ =	0.016	mm	% Silt & Clay =	41.7%	Fineness Modulus =	0.59
$D_{(30)}$ =	0.057	mm	Liquid Limit =	0.0%	Plastic Limit =	0.0%
$D_{(50)}$ =	0.097	mm	Plasticity Index =	0.0%	Moisture %, as sampled =	48.3%
$D_{(60)}$ =	0.124	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	0.386	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	21/47		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		96%	100.0%	0.0%
#20	0.850		95%	100.0%	0.0%
#30	0.600		94%	100.0%	0.0%
#40	0.425	93%	93%	100.0%	0.0%
#50	0.300		83%	100.0%	0.0%
#60	0.250		78%	100.0%	0.0%
#80	0.180		72%	100.0%	0.0%
#100	0.150	69%	69%	100.0%	0.0%
#140	0.106		53%	100.0%	0.0%
#170	0.090		47%	100.0%	0.0%
#200	0.075	41.7%	41.7%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	13-Sep-21
Source:	LDW21-GT37-GB-10-20 ft	**Tested By:**	C. Kriss
Sample#:	B21-1695		

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr :	2.62	
Sample Weight:	74.76	grams
Hydroscopic Moist.:	2.84%	
Adj. Sample Wgt :	72.70	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	18.5	25.6%	0.0505 mm
2	15.5	21.4%	0.0364 mm
5	13.5	18.7%	0.0234 mm
15	10	13.8%	0.0137 mm
30	9	12.4%	0.0097 mm
60	7	9.7%	0.0070 mm
240	4	5.5%	0.0035 mm
1440	1	1.4%	0.0015 mm

% Gravel:	0.5%	**Liquid Limit:**	0.0 %
% Sand:	57.8%	**Plastic Limit:**	0.0 %
% Silt:	34.4%	**Plasticity Index:**	0.0 %
% Clay:	7.3%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	99%	4.750 mm
#10	99%	2.000 mm
#20	95%	0.850 mm
#40	93%	0.425 mm
#100	69%	0.150 mm
#200	41.7%	0.075 mm
Silts	41.1%	0.074 mm
	24.3%	0.050 mm
	17.0%	0.020 mm
Clays	7.3%	0.005 mm
	2.5%	0.002 mm
Colloids	0.9%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Loamy Sand

Comments:

Reviewed by: Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

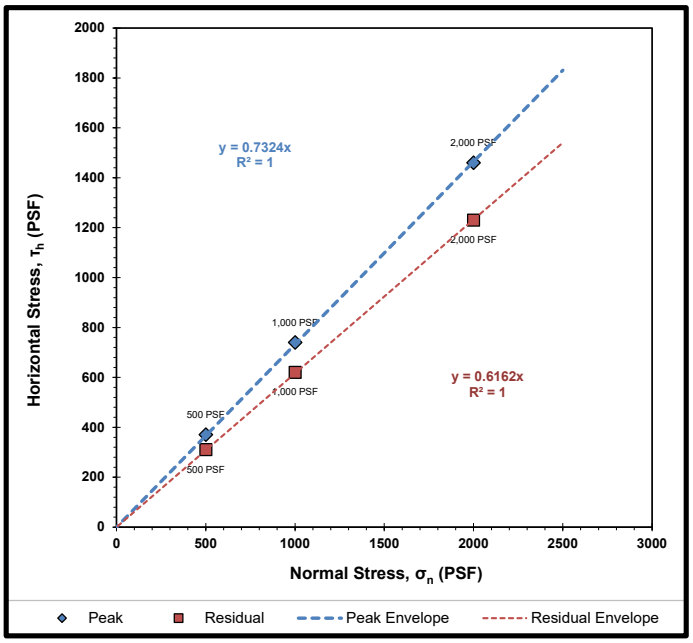
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT37-GB-10-20 ft
Laboratory Sample ID:	B21-1695	**Visual Soil Description:**	brown silty sand
Sample Date:	7/14/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/16/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	35.3	
	Initial	**Post-Consolidation**
Dry Density (PCF):	100.7	102.8
Void Ratio:	0.673	0.639
Porosity (%):	40.2	39.0
Degree of Saturation (%):	saturated	saturated

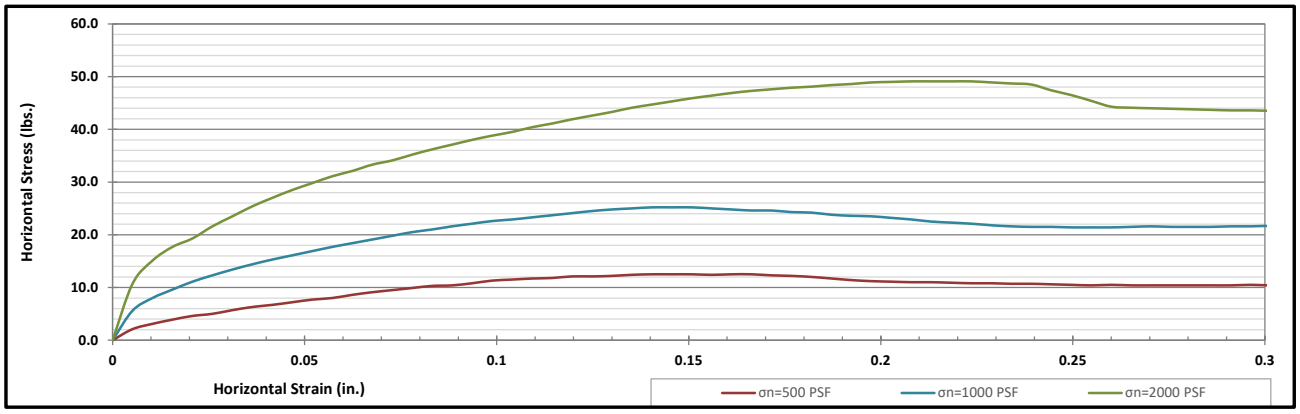
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	36.0	
	Initial	**Post-Consolidation**
Dry Density (PCF):	100.9	110.5
Void Ratio:	0.670	0.525
Porosity (%):	40.1	34.4
Degree of Saturation (%):	saturated	saturated

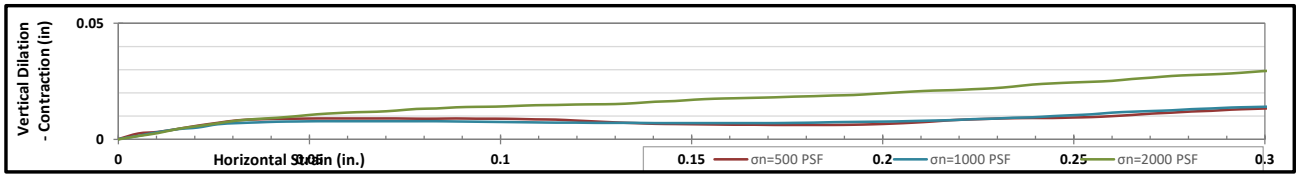
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	35.4	
	Initial	**Post-Consolidation**
Dry Density (PCF):	101.4	114.5
Void Ratio:	0.662	0.471
Porosity (%):	39.8	32.0
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS		
	PEAK	**RESIDUAL**
Angle of Internal Friction, ϕ (°):	**36**	**32**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	370	740	1460
Residual Horizontal Stress, τ_h (PSF):	310	620	1230





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Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT37-GB-20-30 ft
Sample#: B21-1697

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 13-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

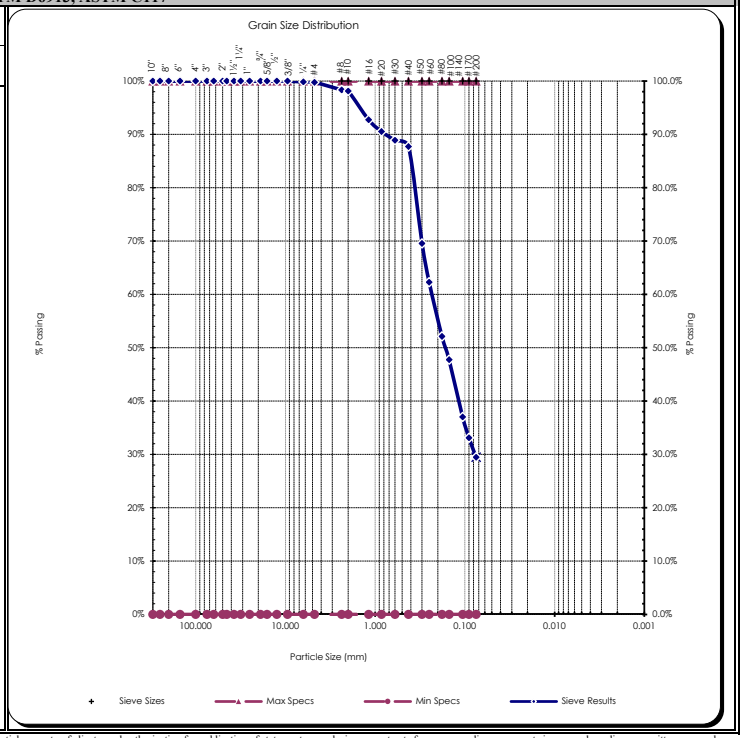
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.013	mm	% Gravel =	0.2%	Coeff. of Curvature, C_C = 1.00
$D_{(10)}$ =	0.025	mm	% Sand =	70.3%	Coeff. of Uniformity, C_U = 9.20
$D_{(15)}$ =	0.038	mm	% Silt & Clay =	29.5%	Fineness Modulus = 1.03
$D_{(30)}$ =	0.077	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.165	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 39.7%
$D_{(60)}$ =	0.234	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.767	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	1/3		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	98%	98%	100.0%	0.0%
#16	1.18		93%	100.0%	0.0%
#20	0.850		91%	100.0%	0.0%
#30	0.600		89%	100.0%	0.0%
#40	0.425	88%	88%	100.0%	0.0%
#50	0.300		70%	100.0%	0.0%
#60	0.250		62%	100.0%	0.0%
#80	0.180		52%	100.0%	0.0%
#100	0.150	48%	48%	100.0%	0.0%
#140	0.106		37%	100.0%	0.0%
#170	0.090		33%	100.0%	0.0%
#200	0.075	29.5%	29.5%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	13-Sep-21
Source:	LDW21-GT37-GB-20-30 ft	**Tested By:**	C. Kriss
Sample #:	B21-1697		

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color
brown

Liquid Limit Determination

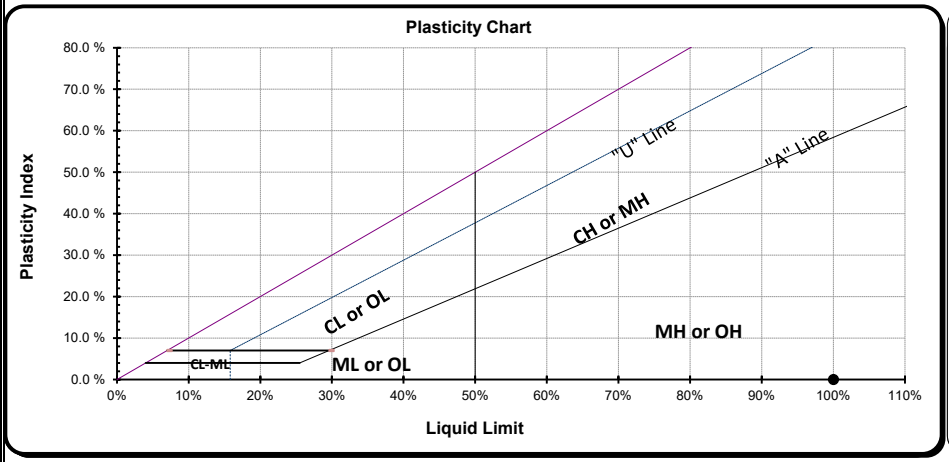
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Liquid limit cannot be established					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

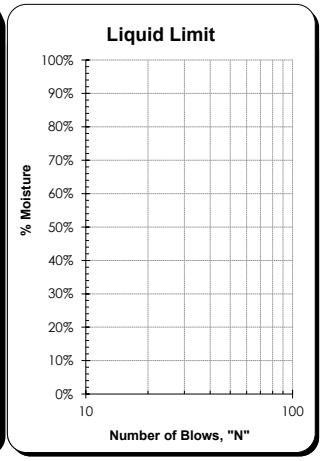
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	13-Sep-21
Source:	LDW21-GT18-GB-0-6.5 ft	**Tested By:**	C. Kriss
Sample #:	B21-1700		

Visual Identification
Sand with Silt
Sample Color
brown

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Liquid limit cannot be established					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

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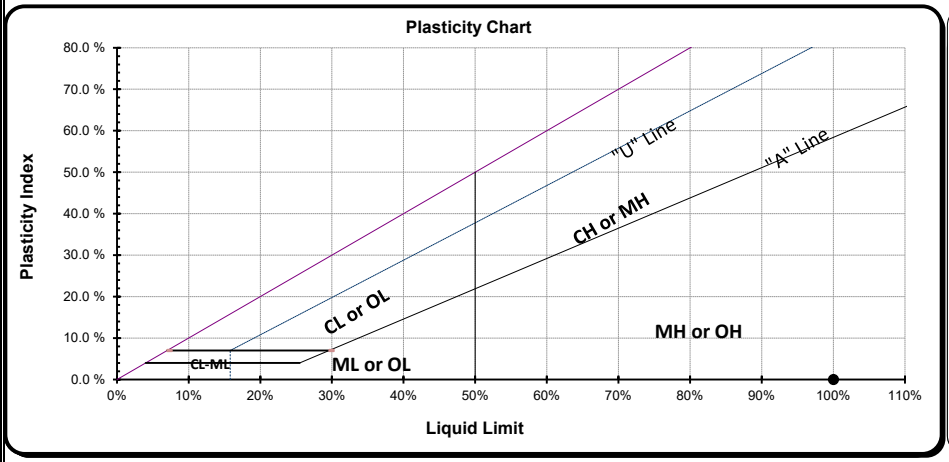
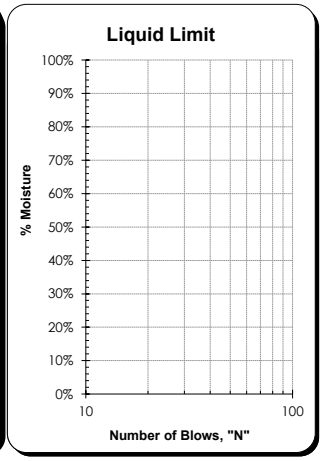
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT18-GB-6.5-16.5 ft
Sample#: B21-1702

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 13-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

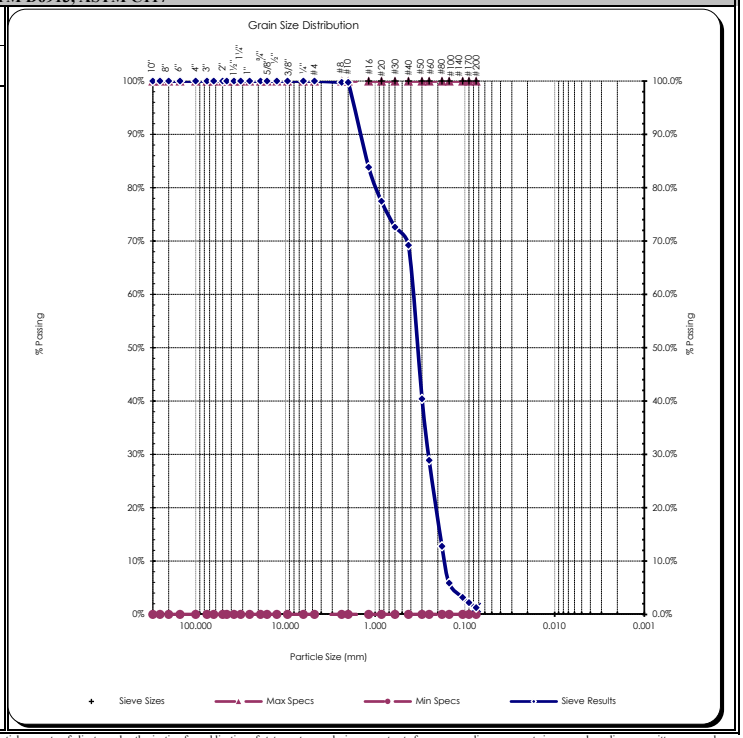
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.136	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C =	1.00
$D_{(10)}$ =	0.168	mm	% Sand =	98.7%	Coeff. of Uniformity, C_U =	2.29
$D_{(15)}$ =	0.190	mm	% Silt & Clay =	1.3%	Fineness Modulus =	1.97
$D_{(30)}$ =	0.255	mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.342	mm	Plasticity Index =	n/a	Moisture %, as sampled =	23.6%
$D_{(60)}$ =	0.385	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	1.497	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	1/54		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		84%	100.0%	0.0%
#20	0.850		77%	100.0%	0.0%
#30	0.600		73%	100.0%	0.0%
#40	0.425	69%	69%	100.0%	0.0%
#50	0.300		40%	100.0%	0.0%
#60	0.250		29%	100.0%	0.0%
#80	0.180		13%	100.0%	0.0%
#100	0.150	6%	6%	100.0%	0.0%
#140	0.106		3%	100.0%	0.0%
#170	0.090		2%	100.0%	0.0%
#200	0.075	1.3%	1.3%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT18-GB-16.5-21.4 ft
Sample#: B21-1704

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 13-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

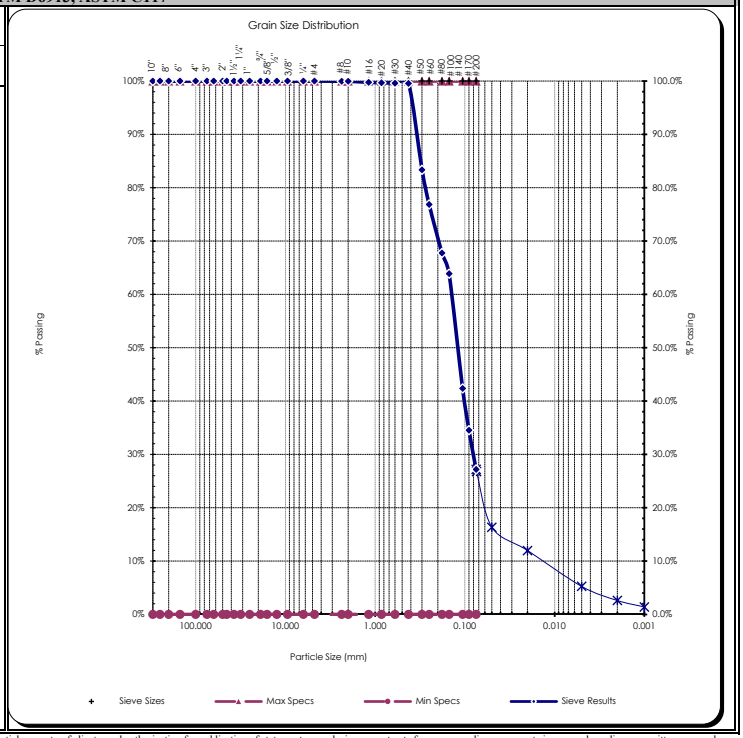
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.005	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 3.31
$D_{(10)}$ =	0.014	mm	% Sand =	72.8%	Coeff. of Uniformity, C_U = 10.24
$D_{(15)}$ =	0.038	mm	% Silt & Clay =	27.2%	Fineness Modulus = 0.53
$D_{(30)}$ =	0.081	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.122	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 37.6%
$D_{(60)}$ =	0.142	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.351	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	3/11		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850		100%	100.0%	0.0%
#30	0.600		100%	100.0%	0.0%
#40	0.425	100%	100%	100.0%	0.0%
#50	0.300		83%	100.0%	0.0%
#60	0.250		77%	100.0%	0.0%
#80	0.180		68%	100.0%	0.0%
#100	0.150	64%	64%	100.0%	0.0%
#140	0.106		42%	100.0%	0.0%
#170	0.090		35%	100.0%	0.0%
#200	0.075	27.2%	27.2%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	1-Sep-21
Source:	LDW21-GT18-GB-16.5-21.4 ft	**Tested By:**	C. Kriss
Sample#:	B21-1704		

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr :	2.53	
Sample Weight:	99.41	grams
Hydroscopic Moist.:	2.98%	
Adj. Sample Wgt :	96.53	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	17	18.1%	0.0526 mm
2	14	14.9%	0.0379 mm
5	12.5	13.3%	0.0242 mm
15	9.5	10.1%	0.0142 mm
30	8	8.5%	0.0101 mm
60	6.5	6.9%	0.0072 mm
240	4	4.3%	0.0036 mm
1440	2	2.1%	0.0015 mm

% Gravel:	0.0%	**Liquid Limit:**	0.0 %
% Sand:	72.8%	**Plastic Limit:**	0.0 %
% Silt:	21.9%	**Plasticity Index:**	0.0 %
% Clay:	5.3%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	100%	0.850 mm
#40	100%	0.425 mm
#100	64%	0.150 mm
#200	27.2%	0.075 mm
Silts	26.8%	0.074 mm
	16.4%	0.050 mm
	12.0%	0.020 mm
Clays	5.3%	0.005 mm
	2.6%	0.002 mm
Colloids	1.4%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Loamy Sand

Comments:

Reviewed by: Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

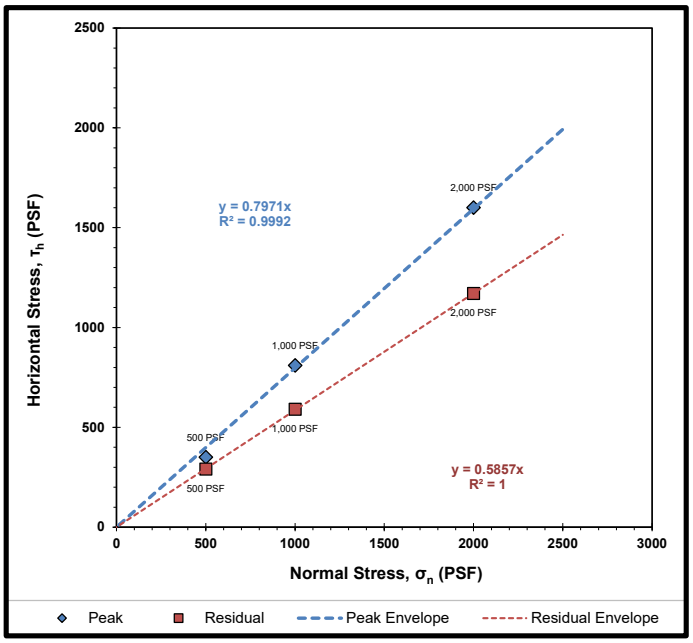
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT18-GB-16.5-21.4 ft
Laboratory Sample ID:	B21-1704	**Visual Soil Description:**	brown silty sand
Sample Date:	7/14/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/17/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	29.4	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.0	107.9
Void Ratio:	0.575	0.562
Porosity (%):	36.5	36.0
Degree of Saturation (%):	saturated	saturated

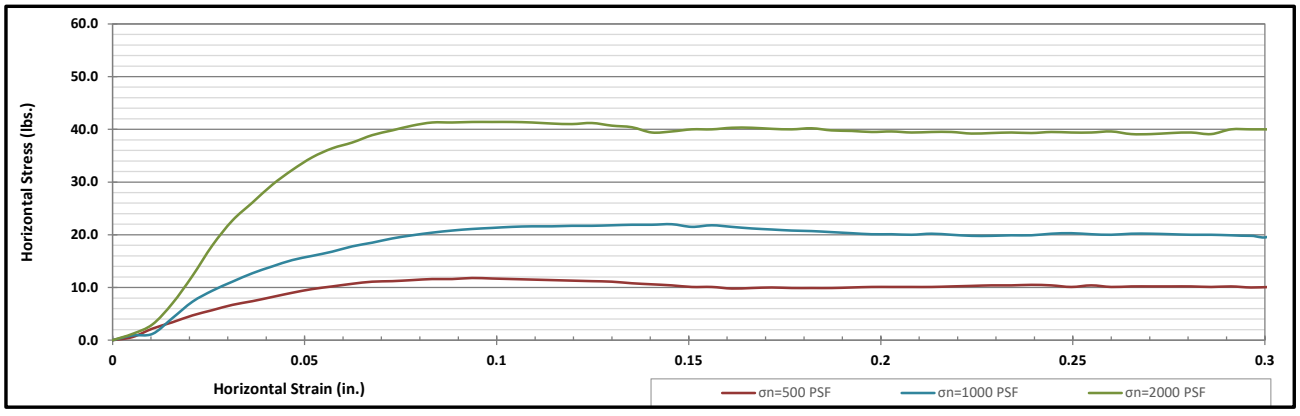
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	28.3	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.4	109.9
Void Ratio:	0.569	0.533
Porosity (%):	36.3	34.8
Degree of Saturation (%):	saturated	saturated

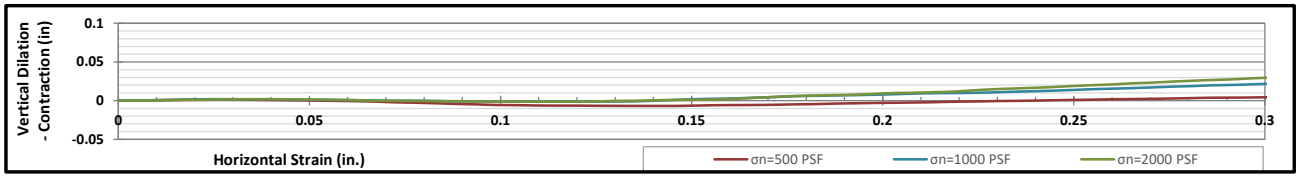
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	29.0	
	Initial	**Post-Consolidation**
Dry Density (PCF):	106.9	110.5
Void Ratio:	0.576	0.525
Porosity (%):	36.5	34.4
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**39**	**30**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	350	810	1600
Residual Horizontal Stress, τ_h (PSF):	290	590	1170





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NW Region • 805 Dupont, Suite #5 • Bellingham, WA 98225 • Phone 360.647.6061 • Fax 360.647.8111
Kitsap Region • 5451 N.W. Newberry Hill Road, Suite 101 • Silverdale, WA 98383 • Phone/Fax 360.698.6787

Visit our website: www.mtc-inc.net

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT18-GB-21.4-26.5 ft
Sample#: B21-1705

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 13-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

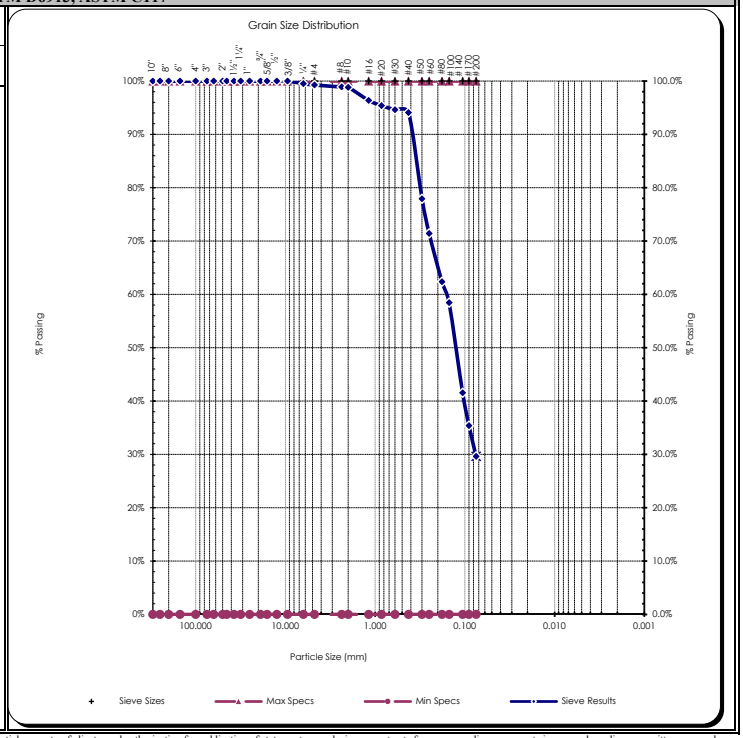
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.013	mm	% Gravel =	0.7%	Coeff. of Curvature, C_C = 1.41
$D_{(10)}$ =	0.025	mm	% Sand =	69.6%	Coeff. of Uniformity, C_U = 6.40
$D_{(15)}$ =	0.038	mm	% Silt & Clay =	29.7%	Fineness Modulus = 0.74
$D_{(30)}$ =	0.076	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.128	mm	Plasticity Index =	n/a	Moisture %, as sampled = 38.4%
$D_{(60)}$ =	0.162	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.393	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	23/73		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		96%	100.0%	0.0%
#20	0.850		95%	100.0%	0.0%
#30	0.600		95%	100.0%	0.0%
#40	0.425	94%	94%	100.0%	0.0%
#50	0.300		78%	100.0%	0.0%
#60	0.250		71%	100.0%	0.0%
#80	0.180		62%	100.0%	0.0%
#100	0.150	58%	58%	100.0%	0.0%
#140	0.106		42%	100.0%	0.0%
#170	0.090		35%	100.0%	0.0%
#200	0.075	29.7%	29.7%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Client:	Anchor QEA	**Date:**	October 6, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-1787-1803
Revised on:		**Date sampled:**	7-12-21 & 7-14-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Date Received: July 29, 2021
Date Tested: September 20, 2021

Client: Anchor QEA
Sampled by: Client
Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1787	LDW21-GT15-GB-0-7.5 ft	233.4	1016.2	787.2	229.0	553.8	41.4%
B21-1788	LDW21-GT15-GB-7.5-9 ft	306.7	450.8	422.5	28.3	115.8	24.4%
B21-1789	LDW21-GT15-GB-7.5-15 ft	236.2	1288.2	1043.0	245.2	806.8	30.4%
B21-1790	LDW21-GT15-GB-15-17.5 ft	303.3	997.2	810.9	186.3	507.6	36.7%
B21-1791	LDW21-GT15-GB-17.5-19 ft	311.1	465.1	434.0	31.1	122.9	25.3%
B21-1792	LDW21-GT15-GB-17.5-25.4 ft	270.2	882.6	747.4	135.2	477.2	28.3%
B21-1793	LDW21-GT15-GB-25.4-27.5 ft	260.6	1270.0	1036.1	233.9	775.5	30.2%
B21-1794	LDW21-GT15-GB-27.5-29 ft	222.9	616.1	520.8	95.3	297.9	32.0%
B21-1795	LDW21-GT29-GB-0-1.5 ft	225.1	949.8	644.5	305.3	419.4	72.8%
B21-1796	LDW21-GT29-GB-0-10.6 ft	221.7	746.6	548.6	198.0	326.9	60.6%
B21-1797	LDW21-GT29-GB-11-12.5 ft	221.4	1082.5	801.0	281.5	579.6	48.6%
B21-1798	LDW21-GT29-GB-11-21 ft	224.4	738.0	646.6	91.4	422.2	21.6%
B21-1799	LDW21-GT29-GB-21-22.5 ft	222.3	408.6	349.3	59.3	127.0	46.7%
B21-1800	LDW21-GT29-GB-21-26 ft	233.8	1031.7	903.6	128.1	669.8	19.1%
B21-1801	LDW21-GT29-GB-26-28.9 ft	229.1	776.5	629.0	147.5	399.9	36.9%
B21-1802	LDW21-GT29-GB-28.9-31 ft	188.4	1285.9	988.6	297.3	800.2	37.2%
B21-1803	LDW21-GT29-GB-31-32.5 ft	225.3	925.7	756.5	169.2	531.2	31.9%

Reviewed by: Meghan Blodgett-Carrillo

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: September 20, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-1787	LDW21-GT15-GB-0-7.5 ft	584.26	658.50	74.2	TSA-014	192.3	499.5	0.99749	735.04	690.54	23.2	2.4966051	0.99929	2.4948325
B21-1792	LDW21-GT15-GB-17.5-25.4 ft	493.62	594.11	100.5	TSA-016	197.2	499.5	0.99754	757.82	695.45	23.0	2.6360571	0.99933	2.634291
B21-1793	LDW21-GT15-GB-25.4-27.5 ft	500.82	575.98	75.2	TSA-022	198.0	499.5	0.99749	740.87	696.19	23.2	2.4661721	0.99929	2.4644211
B21-1796	LDW21-GT29-GB-0-10.6 ft	600.79	675.86	75.1	TSA-012	180.4	499.5	0.99752	722.04	678.65	23.1	2.3695318	0.99931	2.3678968
B21-1798	LDW21-GT29-GB-11-21 ft	584.33	685.35	101.0	TSA-017	187.9	499.4	0.99749	749.71	686.04	23.2	2.7049457	0.99929	2.7030252

Reviewed by:

Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	20-Sep-21
Source:	LDW21-GT15-GB-0-7.5 ft	**Tested By:**	C. Kriss
Sample #:	B21-1787		

Visual Identification
Silt with Sand and Clay
Sample Color
brown

Liquid Limit Determination

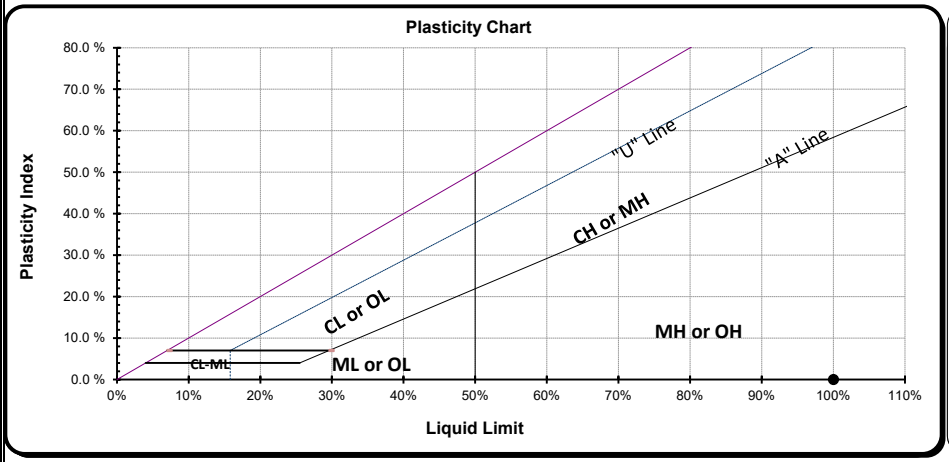
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Liquid limit cannot be established					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

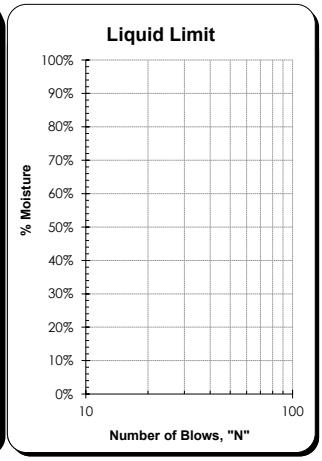
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT15-GB-7.5-15 ft
Sample#: B21-1789

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 20-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

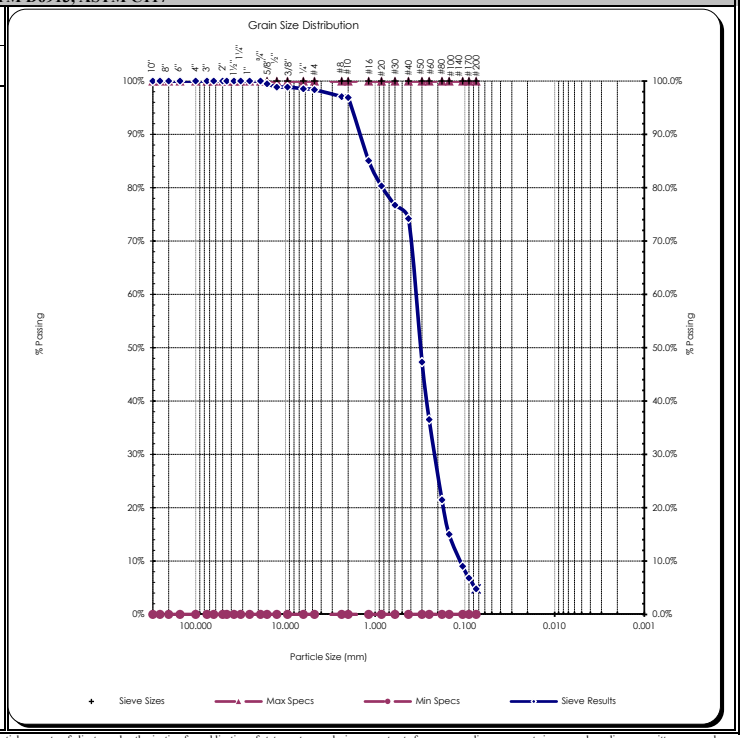
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.076	mm	% Gravel =	1.6%	Coeff. of Curvature, C_C = 1.19
$D_{(10)}$ =	0.113	mm	% Sand =	93.6%	Coeff. of Uniformity, C_U = 3.17
$D_{(15)}$ =	0.150	mm	% Silt & Clay =	4.8%	Fineness Modulus = 1.81
$D_{(30)}$ =	0.220	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.313	mm	Plasticity Index =	n/a	Moisture %, as sampled = 30.4%
$D_{(60)}$ =	0.359	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.522	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	2/31		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		99%	100.0%	0.0%
1/2"	12.50	99%	99%	100.0%	0.0%
3/8"	9.50	99%	99%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	98%	98%	100.0%	0.0%
#8	2.36		97%	100.0%	0.0%
#10	2.00	97%	97%	100.0%	0.0%
#16	1.18		85%	100.0%	0.0%
#20	0.850		80%	100.0%	0.0%
#30	0.600		77%	100.0%	0.0%
#40	0.425	74%	74%	100.0%	0.0%
#50	0.300		47%	100.0%	0.0%
#60	0.250		37%	100.0%	0.0%
#80	0.180		21%	100.0%	0.0%
#100	0.150	15%	15%	100.0%	0.0%
#140	0.106		9%	100.0%	0.0%
#170	0.090		7%	100.0%	0.0%
#200	0.075	4.8%	4.8%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

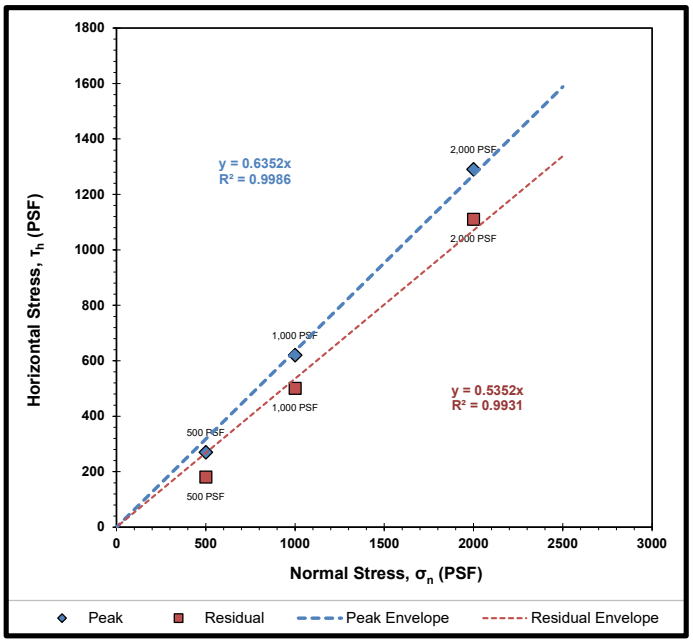
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT15-GB-7.5-15 ft
Laboratory Sample ID:	B21-1789	**Visual Soil Description:**	brown sand with silt
Sample Date:	7/12/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/28/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		**σ_n=500 PSF**
Initial Moisture Content (%):	26.1	
	Initial	**Post-Consolidation**
Dry Density (PCF):	109.2	110.2
Void Ratio:	0.543	0.528
Porosity (%):	35.2	34.6
Degree of Saturation (%):	saturated	saturated

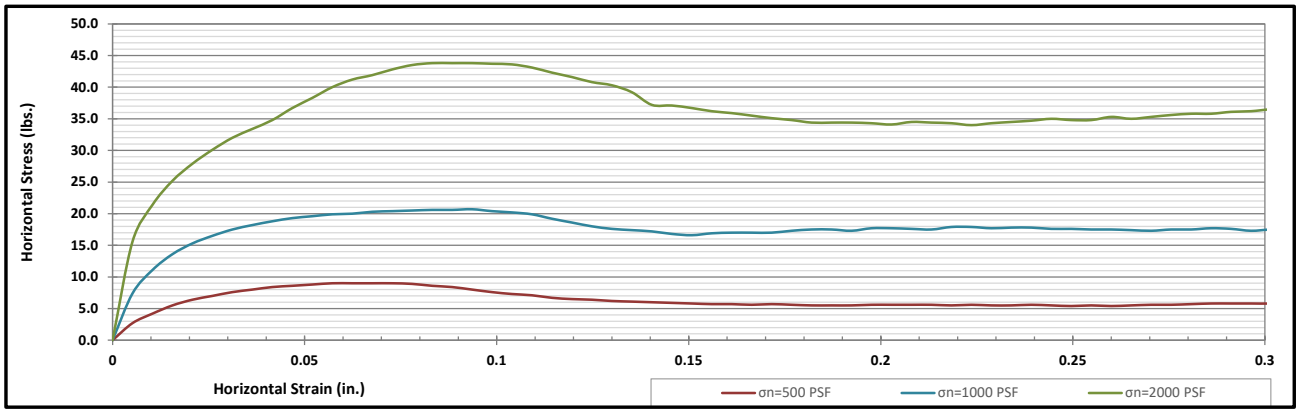
Summary of Sample Data:		**σ_n=1000 PSF**
Initial Moisture Content (%):	25.9	
	Initial	**Post-Consolidation**
Dry Density (PCF):	108.7	110.2
Void Ratio:	0.550	0.529
Porosity (%):	35.5	34.6
Degree of Saturation (%):	saturated	saturated

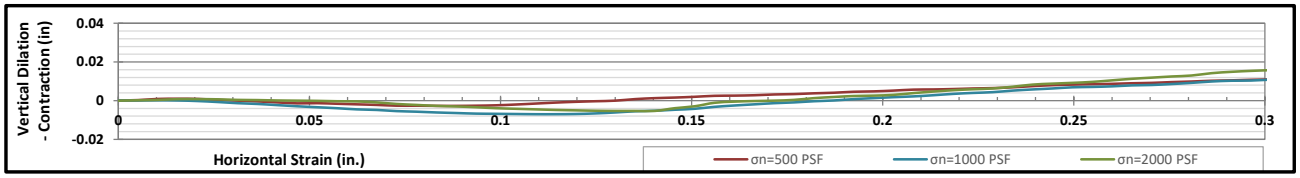
Summary of Sample Data:		**σ_n=2000 PSF**
Initial Moisture Content (%):	25.9	
	Initial	**Post-Consolidation**
Dry Density (PCF):	110.0	114.4
Void Ratio:	0.532	0.473
Porosity (%):	34.7	32.1
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS		
	PEAK	**RESIDUAL**
Angle of Internal Friction, ϕ (°):	**32**	**28**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	270	620	1290
Residual Horizontal Stress, τ_h (PSF):	180	500	1110





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Visit our website: www.mtc-inc.net

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT15-GB-15-17.5 ft
Sample#: B21-1790

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 20-Sep-21
Tested By: C. Kriss

Visual Identification
Sandy Silt with Clay
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

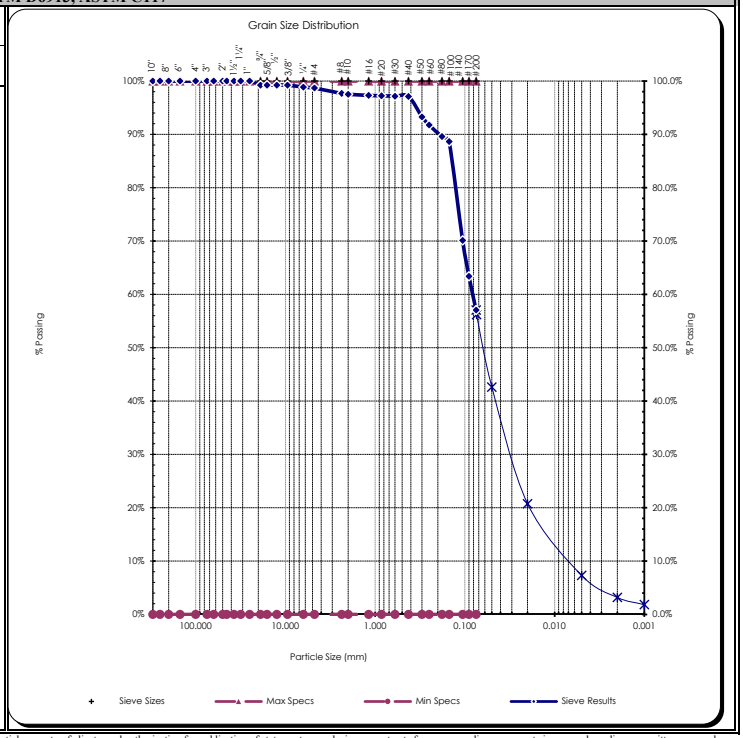
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.004	mm	% Gravel =	1.3%	Coeff. of Curvature, C_C = 2.92
$D_{(10)}$ =	0.006	mm	% Sand =	41.6%	Coeff. of Uniformity, C_U = 12.63
$D_{(15)}$ =	0.012	mm	% Silt & Clay =	57.1%	Fineness Modulus = 0.29
$D_{(30)}$ =	0.039	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.067	mm	Plasticity Index =	n/a	Moisture %, as sampled = 36.7%
$D_{(60)}$ =	0.082	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.193	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	47/80		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	99%	99%	100.0%	0.0%
5/8"	16.00		99%	100.0%	0.0%
1/2"	12.50	99%	99%	100.0%	0.0%
3/8"	9.50	99%	99%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	98%	98%	100.0%	0.0%
#16	1.18		97%	100.0%	0.0%
#20	0.850		97%	100.0%	0.0%
#30	0.600		97%	100.0%	0.0%
#40	0.425	97%	97%	100.0%	0.0%
#50	0.300		93%	100.0%	0.0%
#60	0.250		92%	100.0%	0.0%
#80	0.180		90%	100.0%	0.0%
#100	0.150	89%	89%	100.0%	0.0%
#140	0.106		70%	100.0%	0.0%
#170	0.090		63%	100.0%	0.0%
#200	0.075	57.1%	57.1%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	20-Sep-21
Source:	LDW21-GT15-GB-15-17.5 ft	**Tested By:**	C. Kriss
Sample#:	B21-1790		

Visual Identification
Sandy Silt with Clay
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	75.02	grams
Hydroscopic Moist.:	1.96%	
Adj. Sample Wgt :	73.58	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	25.5	33.8%	0.0477 mm
2	21	27.8%	0.0347 mm
5	17	22.5%	0.0224 mm
15	12	15.9%	0.0133 mm
30	10	13.3%	0.0096 mm
60	8	10.6%	0.0068 mm
240	3.5	4.6%	0.0035 mm
1440	2	2.7%	0.0014 mm

% Gravel:	1.3%	**Liquid Limit:**	n/a
% Sand:	41.6%	**Plastic Limit:**	n/a
% Silt:	49.7%	**Plasticity Index:**	n/a
% Clay:	7.3%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	99%	19.000 mm
5/8"	99%	16.000 mm
1/2"	99%	12.500 mm
3/8"	99%	9.500 mm
1/4"	99%	6.300 mm
#4	99%	4.750 mm
#10	98%	2.000 mm
#20	97%	0.850 mm
#40	97%	0.425 mm
#100	89%	0.150 mm
#200	57.1%	0.075 mm
Silts	56.2%	0.074 mm
	42.6%	0.050 mm
	20.8%	0.020 mm
Clays	7.3%	0.005 mm
	3.2%	0.002 mm
Colloids	1.8%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sandy Loam

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT15-GB-17.5-19 ft
Sample#: B21-1791

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 20-Sep-21
Tested By: C. Kriss

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

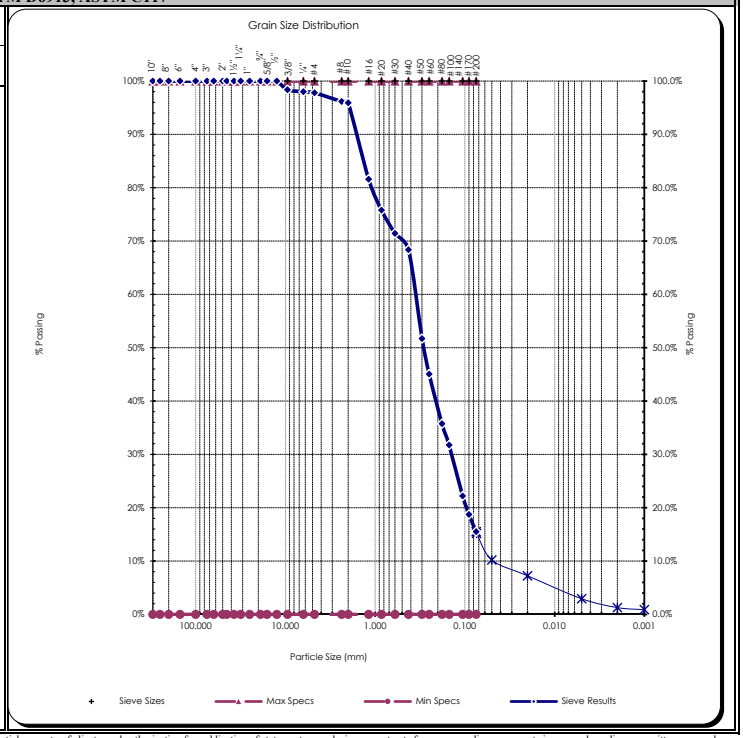
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.007	mm	% Gravel =	2.2%	Coeff. of Curvature, C_C =	0.98
$D_{(10)}$ =	0.056	mm	% Sand =	82.3%	Coeff. of Uniformity, C_U =	6.42
$D_{(15)}$ =	0.073	mm	% Silt & Clay =	15.5%	Fineness Modulus =	1.71
$D_{(30)}$ =	0.142	mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.287	mm	Plasticity Index =	n/a	Moisture %, as sampled =	25.3%
$D_{(60)}$ =	0.362	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	1.662	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	22/97		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	98%	98%	100.0%	0.0%
1/4"	6.30		98%	100.0%	0.0%
#4	4.75	98%	98%	100.0%	0.0%
#8	2.36		96%	100.0%	0.0%
#10	2.00	96%	96%	100.0%	0.0%
#16	1.18		82%	100.0%	0.0%
#20	0.850		76%	100.0%	0.0%
#30	0.600		71%	100.0%	0.0%
#40	0.425	68%	68%	100.0%	0.0%
#50	0.300		52%	100.0%	0.0%
#60	0.250		45%	100.0%	0.0%
#80	0.180		36%	100.0%	0.0%
#100	0.150	32%	32%	100.0%	0.0%
#140	0.106		22%	100.0%	0.0%
#170	0.090		19%	100.0%	0.0%
#200	0.075	15.5%	15.5%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	20-Sep-21
Source:	LDW21-GT15-GB-17.5-19 ft	**Tested By:**	C. Kriss
Sample#:	B21-1791		

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	74.97	grams
Hydroscopic Moist.:	1.06%	
Adj. Sample Wgt :	74.18	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	7	9.1%	0.0532 mm
2	7	9.1%	0.0376 mm
5	6	7.8%	0.0239 mm
15	5	6.5%	0.0139 mm
30	4.5	5.8%	0.0098 mm
60	4	5.2%	0.0070 mm
240	1	1.3%	0.0035 mm
1440	1	1.3%	0.0014 mm

% Gravel:	2.2%	**Liquid Limit:**	n/a
% Sand:	82.3%	**Plastic Limit:**	n/a
% Silt:	12.6%	**Plasticity Index:**	n/a
% Clay:	3.0%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	98%	9.500 mm
1/4"	98%	6.300 mm
#4	98%	4.750 mm
#10	96%	2.000 mm
#20	76%	0.850 mm
#40	68%	0.425 mm
#100	32%	0.150 mm
#200	15.5%	0.075 mm
Silts	15.2%	0.074 mm
	10.2%	0.050 mm
	7.3%	0.020 mm
Clays	3.0%	0.005 mm
	1.3%	0.002 mm
Colloids	0.9%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sand

Comments:

Reviewed by: Meghan Blodgett-Carrillo

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT15-GB-17.5-25.4 ft
Sample#: B21-1792

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 20-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

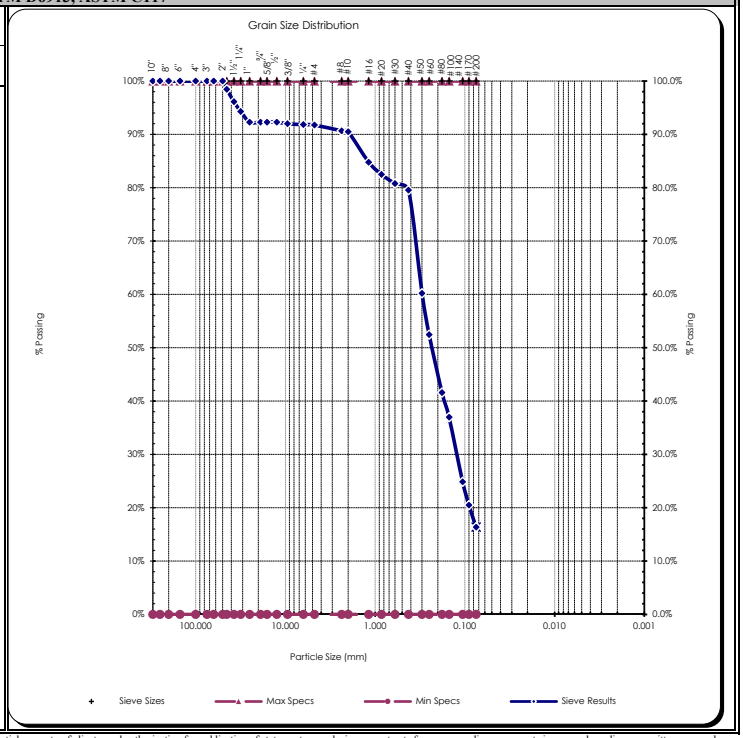
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.023	mm	% Gravel =	8.2%	Coeff. of Curvature, C_C = 1.13
$D_{(10)}$ =	0.046	mm	% Sand =	75.4%	Coeff. of Uniformity, C_U = 6.52
$D_{(15)}$ =	0.069	mm	% Silt & Clay =	16.4%	Fineness Modulus = 1.71
$D_{(30)}$ =	0.125	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.234	mm	Plasticity Index =	n/a	Moisture %, as sampled = 28.3%
$D_{(60)}$ =	0.299	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.927	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	7/34		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		98%	100.0%	0.0%
1.50"	37.50		96%	100.0%	0.0%
1.25"	31.50		94%	100.0%	0.0%
1.00"	25.00	92%	92%	100.0%	0.0%
3/4"	19.00	92%	92%	100.0%	0.0%
5/8"	16.00		92%	100.0%	0.0%
1/2"	12.50	92%	92%	100.0%	0.0%
3/8"	9.50	92%	92%	100.0%	0.0%
1/4"	6.30		92%	100.0%	0.0%
#4	4.75	92%	92%	100.0%	0.0%
#8	2.36		91%	100.0%	0.0%
#10	2.00	91%	91%	100.0%	0.0%
#16	1.18		85%	100.0%	0.0%
#20	0.850		83%	100.0%	0.0%
#30	0.600		81%	100.0%	0.0%
#40	0.425	80%	80%	100.0%	0.0%
#50	0.300		60%	100.0%	0.0%
#60	0.250		52%	100.0%	0.0%
#80	0.180		42%	100.0%	0.0%
#100	0.150	37%	37%	100.0%	0.0%
#140	0.106		25%	100.0%	0.0%
#170	0.090		20%	100.0%	0.0%
#200	0.075	16.4%	16.4%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT15-GB-25.4-27.5 ft
Sample#: B21-1793

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 20-Sep-21
Tested By: C. Kriss

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

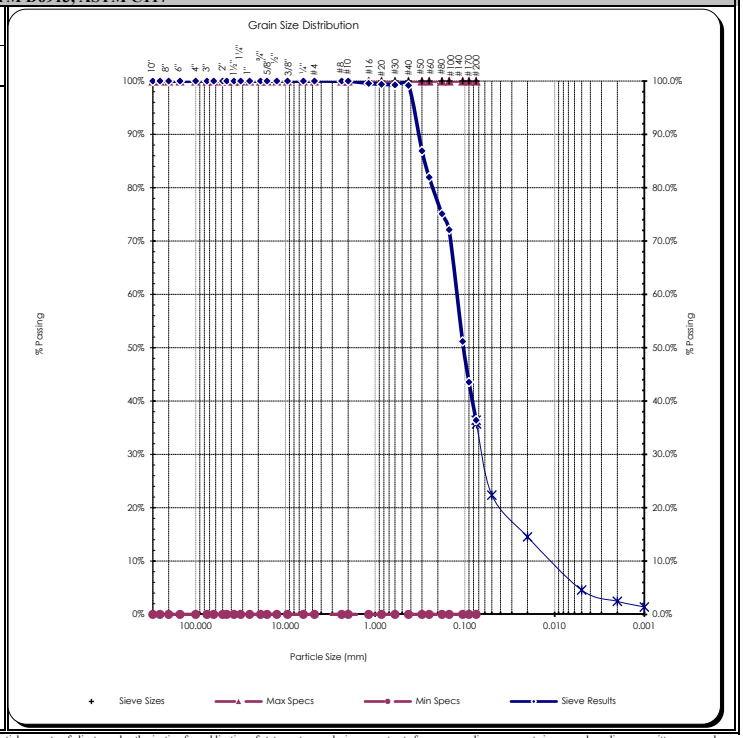
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.006	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 3.56
$D_{(10)}$ =	0.010	mm	% Sand =	63.6%	Coeff. of Uniformity, C_U = 12.70
$D_{(15)}$ =	0.022	mm	% Silt & Clay =	36.4%	Fineness Modulus = 0.42
$D_{(30)}$ =	0.066	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.104	mm	Plasticity Index =	n/a	Moisture %, as sampled = 30.2%
$D_{(60)}$ =	0.125	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.331	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	29/79		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		87%	100.0%	0.0%
#60	0.250		82%	100.0%	0.0%
#80	0.180		75%	100.0%	0.0%
#100	0.150	72%	72%	100.0%	0.0%
#140	0.106		51%	100.0%	0.0%
#170	0.090		44%	100.0%	0.0%
#200	0.075	36.4%	36.4%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	20-Sep-21
Source:	LDW21-GT15-GB-25.4-27.5 ft	**Tested By:**	C. Kriss
Sample#:	B21-1793		

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr :	2.46	
Sample Weight:	76.16	grams
Hydroscopic Moist.:	4.72%	
Adj. Sample Wgt :	72.73	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	15	21.7%	0.0541 mm
2	13.5	19.5%	0.0388 mm
5	11	15.9%	0.0248 mm
15	9	13.0%	0.0145 mm
30	7.5	10.8%	0.0104 mm
60	4.5	6.5%	0.0074 mm
240	2.5	3.6%	0.0038 mm
1440	1.5	2.2%	0.0015 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	63.6%	**Plastic Limit:**	n/a
% Silt:	31.8%	**Plasticity Index:**	n/a
% Clay:	4.6%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	99%	0.850 mm
#40	99%	0.425 mm
#100	72%	0.150 mm
#200	36.4%	0.075 mm
Silts	35.7%	0.074 mm
	22.4%	0.050 mm
	14.5%	0.020 mm
Clays	4.6%	0.005 mm
	2.5%	0.002 mm
Colloids	1.4%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Loamy Sand

Comments:

Reviewed by: Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21	**Visual Identification**	
Project #:	21B233	**Sampled By:**	Client	Silt	
Client:	Anchor QEA	**Date Tested:**	21-Sep-21	**Sample Color**	
Source:	LDW21-GT29-0-10.6 ft	**Tested By:**	C. Kriss	brown	
Sample #:	B21-1796				

Liquid Limit Determination

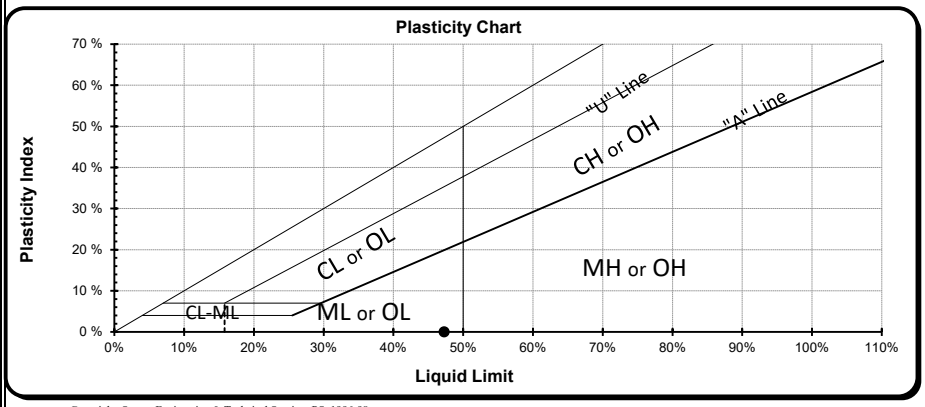
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	32.74	33.79	36.07			
Weight of Dry Soils + Pan:	28.61	29.18	30.52			
Weight of Pan:	19.91	19.73	19.61			
Weight of Dry Soils:	8.70	9.45	10.91			
Weight of Moisture:	4.13	4.61	5.55			
% Moisture:	47.5 %	48.8 %	50.9 %			
Number of Blows:	25	16	11			

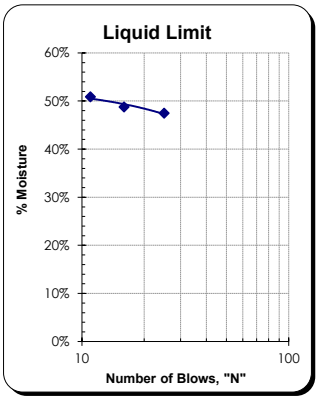
Liquid Limit @ 25 Blows: 47 %
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974

Visit our website: www.mtc-inc.net

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT29-GB-11-21 ft
Sample#: B21-1798

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 20-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

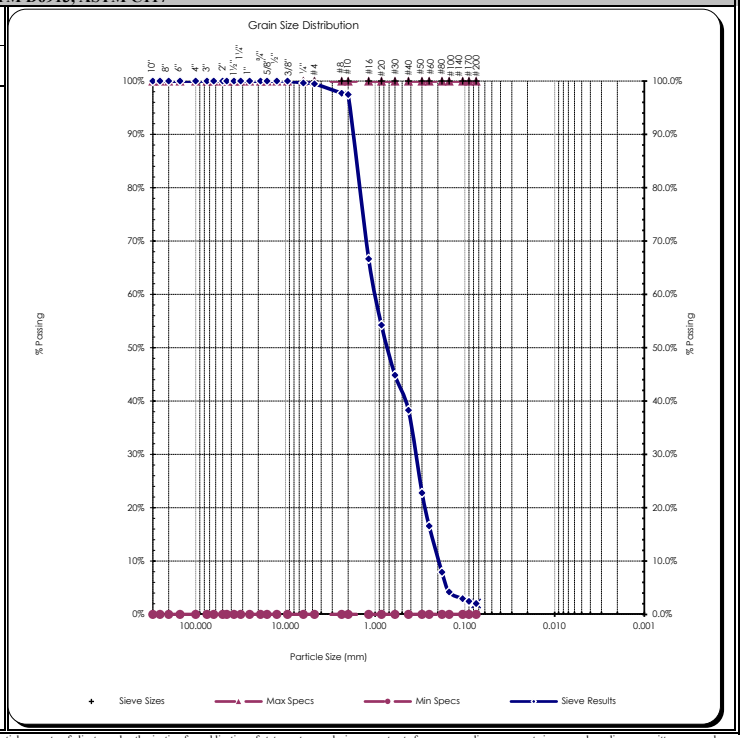
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.156	mm	% Gravel =	0.5%	Coeff. of Curvature, C_C = 0.65
$D_{(10)}$ =	0.197	mm	% Sand =	97.4%	Coeff. of Uniformity, C_U = 5.10
$D_{(15)}$ =	0.237	mm	% Silt & Clay =	2.0%	Fineness Modulus = 2.64
$D_{(30)}$ =	0.358	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.737	mm	Plasticity Index =	n/a	Moisture %, as sampled = 21.6%
$D_{(60)}$ =	1.003	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.801	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	3/56		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	97%	97%	100.0%	0.0%
#16	1.18		67%	100.0%	0.0%
#20	0.850		54%	100.0%	0.0%
#30	0.600		45%	100.0%	0.0%
#40	0.425	38%	38%	100.0%	0.0%
#50	0.300		23%	100.0%	0.0%
#60	0.250		17%	100.0%	0.0%
#80	0.180		8%	100.0%	0.0%
#100	0.150	4%	4%	100.0%	0.0%
#140	0.106		3%	100.0%	0.0%
#170	0.090		2%	100.0%	0.0%
#200	0.075	2.0%	2.0%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT29-GB-21-26 ft
Sample#: B21-1800

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 20-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
gray

ACCREDITED
Certificate #: 1366.01

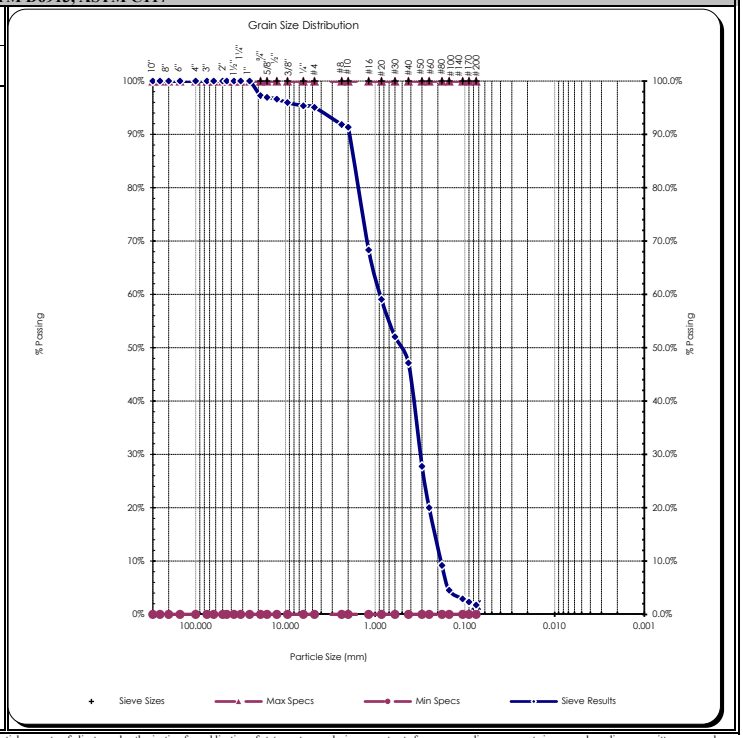
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.153	mm	% Gravel =	4.9%	Coeff. of Curvature, C_C = 0.60
$D_{(10)}$ =	0.185	mm	% Sand =	93.3%	Coeff. of Uniformity, C_U = 4.77
$D_{(15)}$ =	0.218	mm	% Silt & Clay =	1.8%	Fineness Modulus = 2.67
$D_{(30)}$ =	0.314	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.527	mm	Plasticity Index =	n/a	Moisture %, as sampled = 18.8%
$D_{(60)}$ =	0.883	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.952	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	3/80		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	97%	97%	100.0%	0.0%
5/8"	16.00		97%	100.0%	0.0%
1/2"	12.50	97%	97%	100.0%	0.0%
3/8"	9.50	96%	96%	100.0%	0.0%
1/4"	6.30		95%	100.0%	0.0%
#4	4.75	95%	95%	100.0%	0.0%
#8	2.36		92%	100.0%	0.0%
#10	2.00	91%	91%	100.0%	0.0%
#16	1.18		68%	100.0%	0.0%
#20	0.850		59%	100.0%	0.0%
#30	0.600		52%	100.0%	0.0%
#40	0.425	47%	47%	100.0%	0.0%
#50	0.300		28%	100.0%	0.0%
#60	0.250		20%	100.0%	0.0%
#80	0.180		9%	100.0%	0.0%
#100	0.150	5%	5%	100.0%	0.0%
#140	0.106		3%	100.0%	0.0%
#170	0.090		2%	100.0%	0.0%
#200	0.075	1.8%	1.8%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

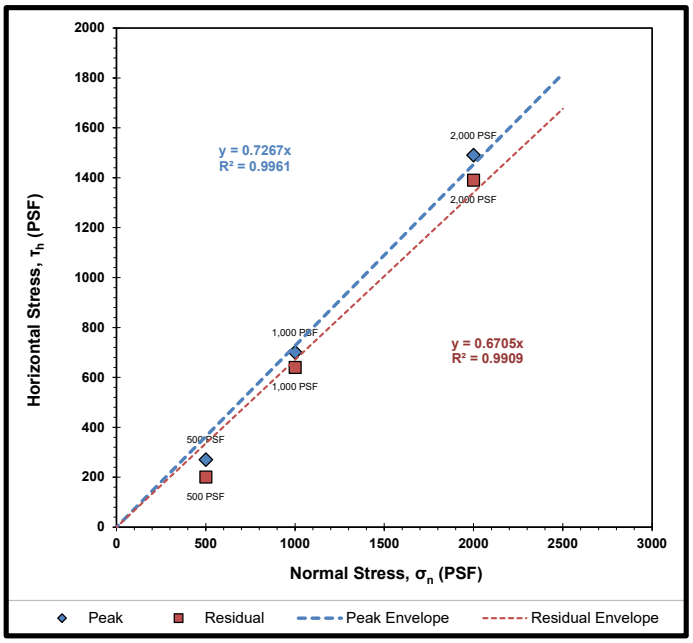
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT29-GB-21-26 ft
Laboratory Sample ID:	B21-1800	**Visual Soil Description:**	gray sand
Sample Date:	7/14/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/29/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	23.0	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.5	108.1
Void Ratio:	0.567	0.558
Porosity (%):	36.2	35.8
Degree of Saturation (%):	saturated	saturated

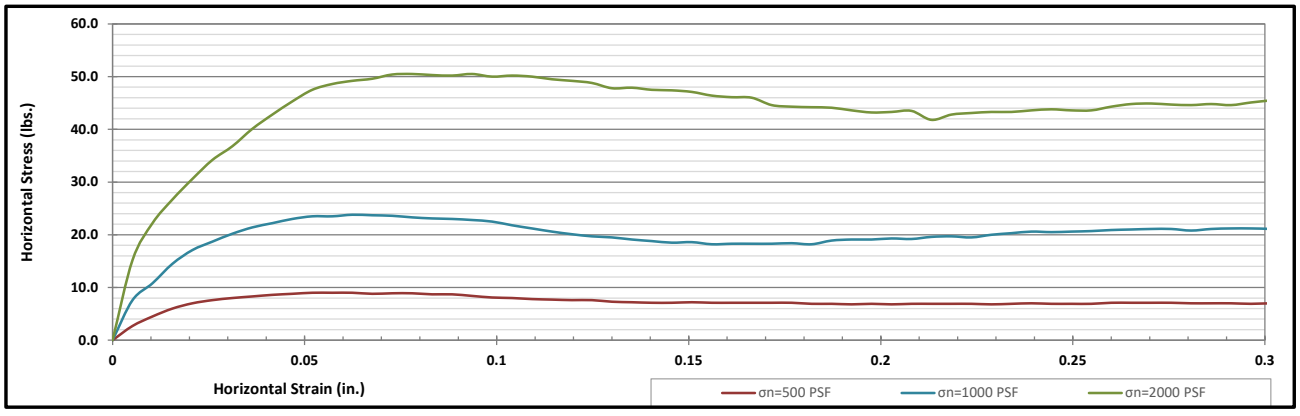
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	22.3	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.1	108.5
Void Ratio:	0.572	0.552
Porosity (%):	36.4	35.6
Degree of Saturation (%):	saturated	saturated

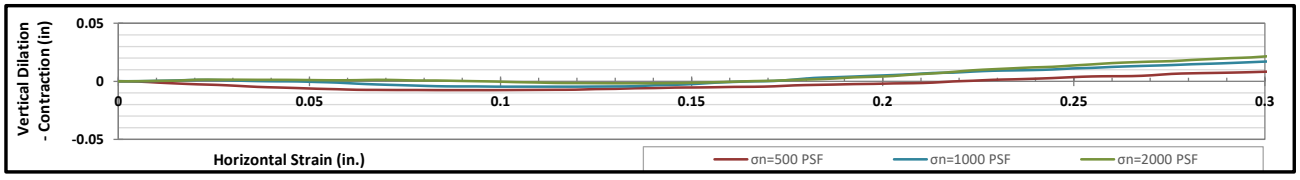
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	21.8	
	Initial	**Post-Consolidation**
Dry Density (PCF):	108.8	110.9
Void Ratio:	0.548	0.519
Porosity (%):	35.4	34.2
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**36**	**34**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	270	700	1490
Residual Horizontal Stress, τ_h (PSF):	200	640	1390





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NW Region • 805 Dupont, Suite #5 • Bellingham, WA 98225 • Phone 360.647.6061 • Fax 360.647.8111
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Visit our website: www.mtc-inc.net

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT29-GB-26-28.9 ft
Sample#: B21-1801

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 20-Sep-21
Tested By: C. Kriss

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

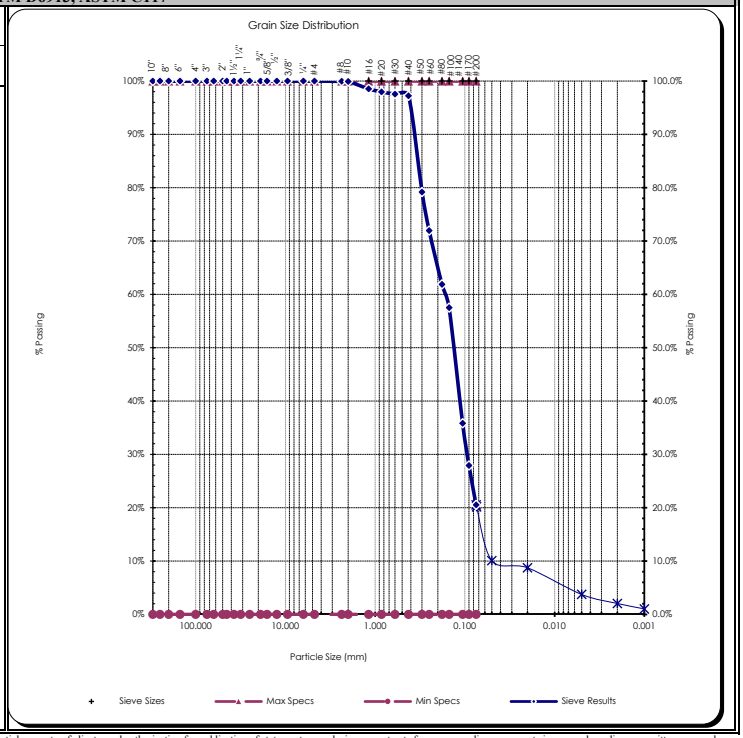
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.008	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.33
$D_{(10)}$ =	0.040	mm	% Sand =	79.4%	Coeff. of Uniformity, C_U = 4.18
$D_{(15)}$ =	0.061	mm	% Silt & Clay =	20.6%	Fineness Modulus = 0.67
$D_{(30)}$ =	0.094	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.135	mm	Plasticity Index =	n/a	Moisture %, as sampled = 36.9%
$D_{(60)}$ =	0.167	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.375	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	15/71		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850		98%	100.0%	0.0%
#30	0.600		98%	100.0%	0.0%
#40	0.425	97%	97%	100.0%	0.0%
#50	0.300		79%	100.0%	0.0%
#60	0.250		72%	100.0%	0.0%
#80	0.180		62%	100.0%	0.0%
#100	0.150	58%	58%	100.0%	0.0%
#140	0.106		36%	100.0%	0.0%
#170	0.090		28%	100.0%	0.0%
#200	0.075	20.6%	20.6%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	20-Sep-21
Source:	LDW21-GT29-GB-26-28.9 ft	**Tested By:**	C. Kriss
Sample#:	B21-1801		

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	100.10	grams
Hydroscopic Moist.:	1.34%	
Adj. Sample Wgt :	98.78	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	11.5	11.6%	0.0520 mm
2	9.5	9.6%	0.0371 mm
5	9	9.1%	0.0235 mm
15	8	8.1%	0.0137 mm
30	6	6.1%	0.0097 mm
60	4	4.0%	0.0070 mm
240	3.5	3.5%	0.0035 mm
1440	1.5	1.5%	0.0014 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	79.4%	**Plastic Limit:**	n/a
% Silt:	16.8%	**Plasticity Index:**	n/a
% Clay:	3.8%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	98%	0.850 mm
#40	97%	0.425 mm
#100	58%	0.150 mm
#200	20.6%	0.075 mm
Silts	20.2%	0.074 mm
	10.1%	0.050 mm
	8.7%	0.020 mm
Clays	3.8%	0.005 mm
	2.1%	0.002 mm
Colloids	1.1%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sand

Comments:

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT29-GB-28.9-31 ft
Sample#: B21-1802

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 20-Sep-21
Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

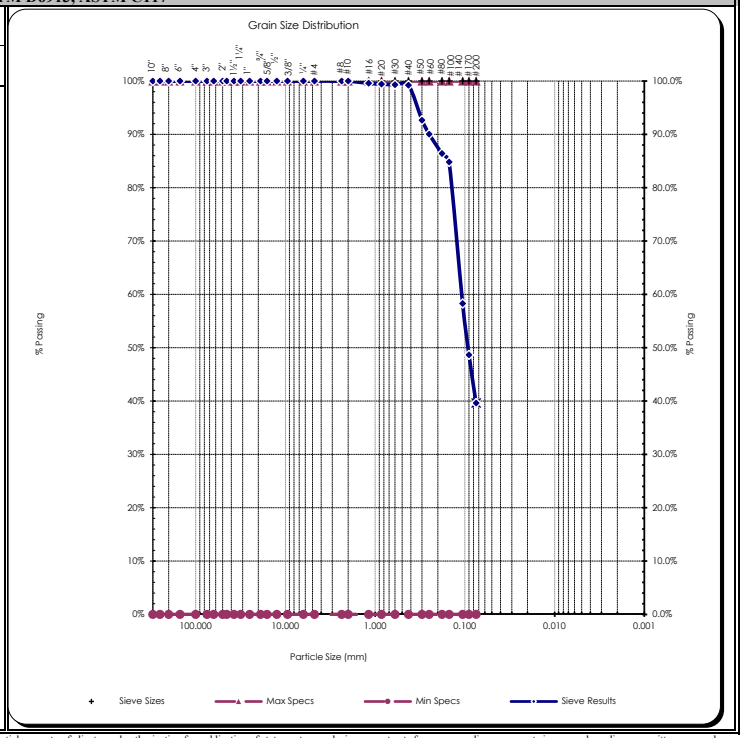
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.009	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.57
$D_{(10)}$ =	0.019	mm	% Sand =	60.4%	Coeff. of Uniformity, C_U = 5.75
$D_{(15)}$ =	0.028	mm	% Silt & Clay =	39.6%	Fineness Modulus = 0.24
$D_{(30)}$ =	0.057	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.092	mm	Plasticity Index =	n/a	Moisture %, as sampled = 37.2%
$D_{(60)}$ =	0.109	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.249	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	2/5		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		93%	100.0%	0.0%
#60	0.250		90%	100.0%	0.0%
#80	0.180		86%	100.0%	0.0%
#100	0.150	85%	85%	100.0%	0.0%
#140	0.106		58%	100.0%	0.0%
#170	0.090		49%	100.0%	0.0%
#200	0.075	39.6%	39.6%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Client:	Anchor QEA	**Date:**	October 14, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-1812 - 1832
Revised on:		**Date sampled:**	July 15, 2021

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Date Received: July 29, 2021
Date Tested: September 23, 2021

Client: Anchor QEA
Sampled by: Client
Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1812	LDW21-GT25-GB-0-1.5 ft	233.7	903.3	628.8	274.5	395.1	69.5%
B21-1813	LDW21-GT25-GB-0-8.5 ft	260.6	578.9	450.1	128.8	189.5	68.0%
B21-1814	LDW21-GT25-GB-8.5-10 ft	306.5	1244.3	1034.1	210.2	727.6	28.9%
B21-1815	LDW21-GT25-GB-8.5-16.2 ft	234.4	975.8	829.1	146.7	594.7	24.7%
B21-1816	LDW21-GT25-GB-16.2-18.5 ft	301.0	1029.3	834.6	194.7	533.6	36.5%
B21-1817	LDW21-GT25-GB-18.5-20 ft	311.0	1016.3	872.1	144.2	561.1	25.7%
B21-1818	LDW21-GT25-GB-18.5-24.4 ft	182.5	963.7	746.1	217.6	563.6	38.6%
B21-1819	LDW21-GT25-GB-24.4-26ft	268.9	846.8	702.0	144.8	433.1	33.4%
B21-1820	LDW21-GT25-GB-26-28.5 ft	229.0	653.6	545.0	108.6	316.0	34.4%
B21-1821	LDW21-GT25-GB-28.5-30 ft	221.8	847.9	689.3	158.6	467.5	33.9%
B21-1822	LDW21-GT33-GB-0-1.5 ft	223.1	962.3	671.6	290.7	448.5	64.8%
B21-1823	LDW21-GT33-GB-0-10.4 ft	225.2	643.8	515.2	128.6	290.0	44.3%
B21-1824	LDW21-GT33-GB-11-12.5 ft	221.3	1042.8	776.6	266.2	555.3	47.9%
B21-1825	LDW21-GT33-GB-11-18.5 ft	225.3	614.1	543.5	70.6	318.2	22.2%
B21-1826	LDW21-GT33-GB-18.3-21 ft	215.8	753.3	613.6	139.7	397.8	35.1%
B21-1827	LDW21-GT33-GB-21-22.5 ft	220.8	673.2	554.6	118.6	333.8	35.5%
B21-1828	LDW21-GT33-GB-21-26.8 ft	217.3	766.4	626.0	140.4	408.7	34.4%
B21-1829	LDW21-GT33-GB-26.8-28.8 ft	233.1	799.7	630.2	169.5	397.1	42.7%
B21-1830	LDW21-GT33-GB-28.8-29.5 ft	223.1	1026.1	824.1	202.0	601.0	33.6%
B21-1831	LDW21-GT33-GB-29.5-31 ft	221.8	989.1	767.9	221.2	546.1	40.5%
B21-1832	LDW21-GT33-GB-31-32.5 ft	208.9	577.5	479.9	97.6	271.0	36.0%

Reviewed by: Meghan Blodgett-Carrillo

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: September 20, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-1813	LDW21-GT25-GB-0-8.5 ft	498.19	565.01	66.8	TSA-022	198.0	499.5	0.99759	737.17	696.24	22.8	2.5812856	0.99938	2.5796852
B21-1820	LDW21-GT25-GB-26-28.5 ft	510.35	585.58	75.2	TSA-015	187.6	499.5	0.99780	732.43	686.00	21.9	2.612047	0.99959	2.6109761
B21-1825	LDW21-GT33-GB-11-18.5 ft	502.55	602.33	99.8	TSA-023	163.9	498.7	0.99786	723.74	661.59	21.6	2.6514178	0.99966	2.6505163

Reviewed by:
Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA, LLC	**Date Tested:**	25-Sep-21
Source:	LDW21-GT25-GB-0-8.5 ft	**Tested By:**	K. Mendez
Sample #:	B21-1813		

Visual Identification
Silt with Clay
Sample Color
brown

Liquid Limit Determination

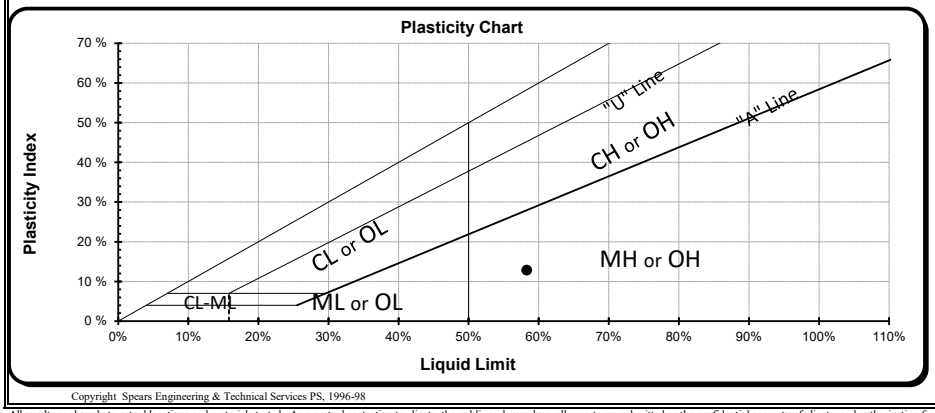
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	29.60	25.42	26.01			
Weight of Dry Soils + Pan:	25.96	21.62	21.93			
Weight of Pan:	19.65	15.20	15.00			
Weight of Dry Soils:	6.31	6.42	6.93			
Weight of Moisture:	3.64	3.80	4.08			
% Moisture:	57.7 %	59.2 %	58.9 %			
Number of Blows:	28	22	17			

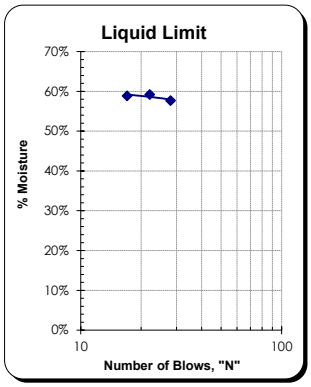
Liquid Limit @ 25 Blows: 58 %
Plastic Limit: 45 %
Plasticity Index, I_P: 13 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	35.15	34.29				
Weight of Dry Soils + Pan:	33.00	32.39				
Weight of Pan:	28.27	28.20				
Weight of Dry Soils:	4.73	4.19				
Weight of Moisture:	2.15	1.90				
% Moisture:	45.5 %	45.4 %				

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: _____

Reviewed by: Meghan Blodgett-Carrillo

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT25-GB-8.5-16.2 ft
Sample#: B21-1815

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 25-Sep-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

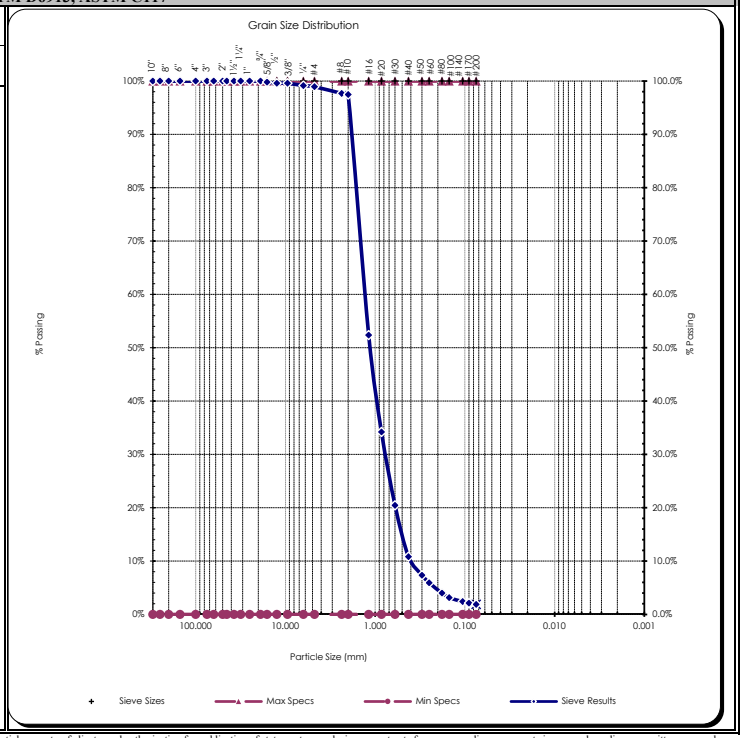
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.216	mm	% Gravel =	1.1%	Coeff. of Curvature, C_C = 1.15
$D_{(10)}$ =	0.395	mm	% Sand =	97.0%	Coeff. of Uniformity, C_U = 3.34
$D_{(15)}$ =	0.501	mm	% Silt & Clay =	1.9%	Fineness Modulus = 3.20
$D_{(30)}$ =	0.773	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	1.137	mm	Plasticity Index =	n/a	Moisture %, as sampled = 24.7%
$D_{(60)}$ =	1.318	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.864	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	17/97		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	97%	97%	100.0%	0.0%
#16	1.18		52%	100.0%	0.0%
#20	0.850		34%	100.0%	0.0%
#30	0.600		20%	100.0%	0.0%
#40	0.425	11%	11%	100.0%	0.0%
#50	0.300		7%	100.0%	0.0%
#60	0.250		6%	100.0%	0.0%
#80	0.180		4%	100.0%	0.0%
#100	0.150	3%	3%	100.0%	0.0%
#140	0.106		2%	100.0%	0.0%
#170	0.090		2%	100.0%	0.0%
#200	0.075	1.9%	1.9%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

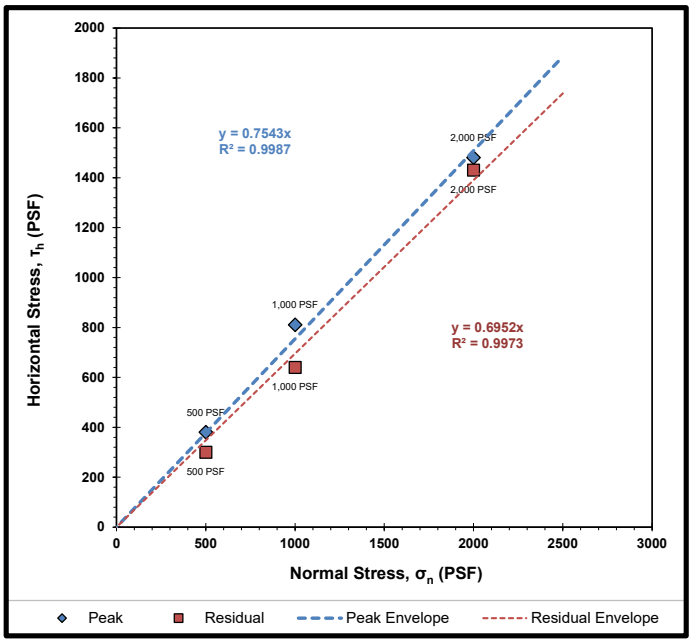
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT25-GB-8.5-16.2 ft
Laboratory Sample ID:	B21-1815	**Visual Soil Description:**	brown sand with silt
Sample Date:	7/15/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	9/30/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		**σ_n=500 PSF**
Initial Moisture Content (%):	25.1	
	Initial	**Post-Consolidation**
Dry Density (PCF):	108.7	109.7
Void Ratio:	0.550	0.536
Porosity (%):	35.5	34.9
Degree of Saturation (%):	saturated	saturated

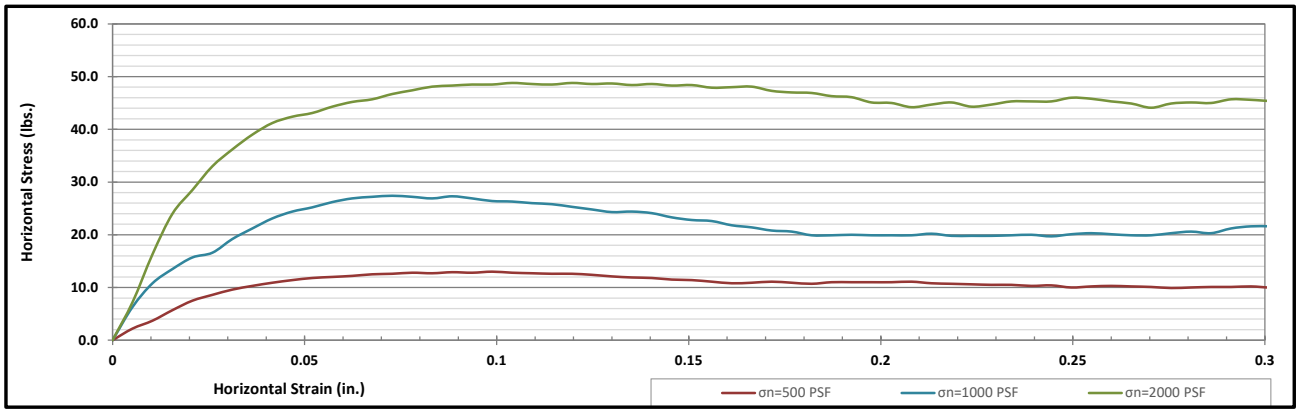
Summary of Sample Data:		**σ_n=1000 PSF**
Initial Moisture Content (%):	24.7	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.3	108.8
Void Ratio:	0.571	0.549
Porosity (%):	36.3	35.4
Degree of Saturation (%):	saturated	saturated

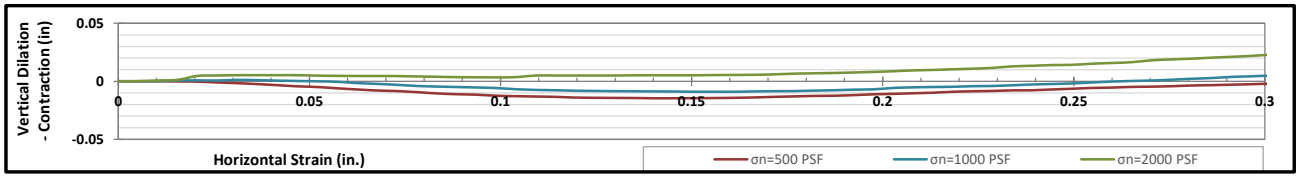
Summary of Sample Data:		**σ_n=2000 PSF**
Initial Moisture Content (%):	25.6	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.7	110.3
Void Ratio:	0.564	0.527
Porosity (%):	36.0	34.5
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS		
	PEAK	**RESIDUAL**
Angle of Internal Friction, ϕ (°):	**37**	**35**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	380	810	1480
Residual Horizontal Stress, τ_h (PSF):	300	640	1430





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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA, LLC	**Date Tested:**	25-Sep-21
Source:	LDW21-GT25-GB-16.2-18.5 ft	**Tested By:**	K. Mendez
Sample #:	B21-1816		

Visual Identification
Sand
Sample Color
grayish-brown

Liquid Limit Determination

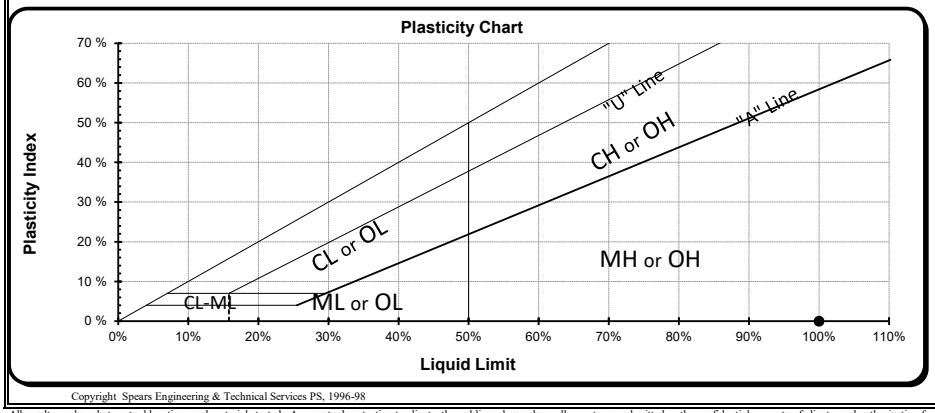
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Unable to esablish liquid limit					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

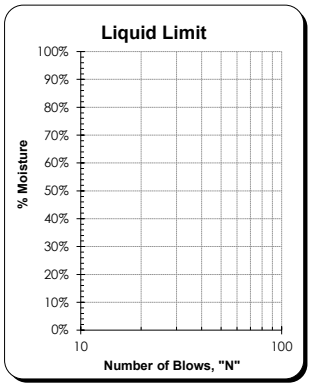
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Cannot determined plastic limit					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA, LLC	**Date Tested:**	25-Sep-21
Source:	LDW21-GT25-GB-18.5-24.4 ft	**Tested By:**	K. Mendez
Sample #:	B21-1818		

Visual Identification
Sand
Sample Color
grayish-brown

Liquid Limit Determination

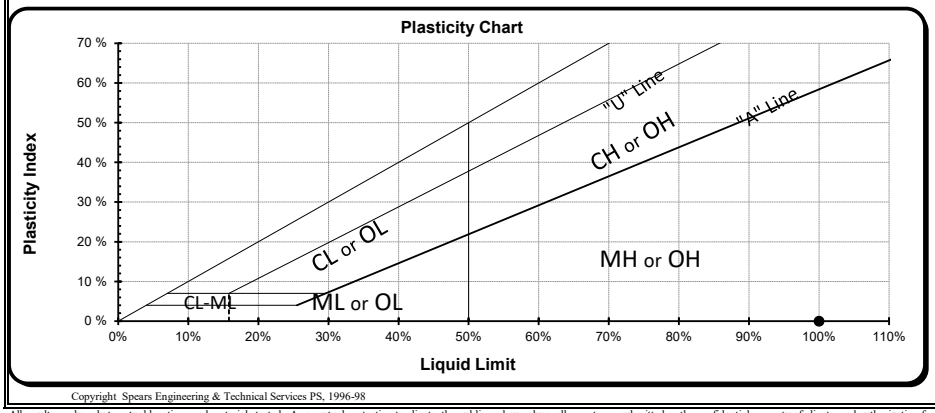
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Unable to esablish liquid limit					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

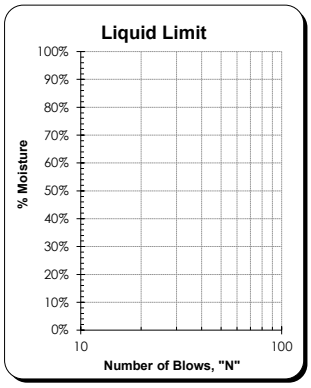
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Cannot determined plastic limit					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT25-GB-26-28.5 ft
Sample#: B21-1820

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 25-Sep-21
Tested By: K. Mendez

Visual Identification
Sandy Silt with Clay
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

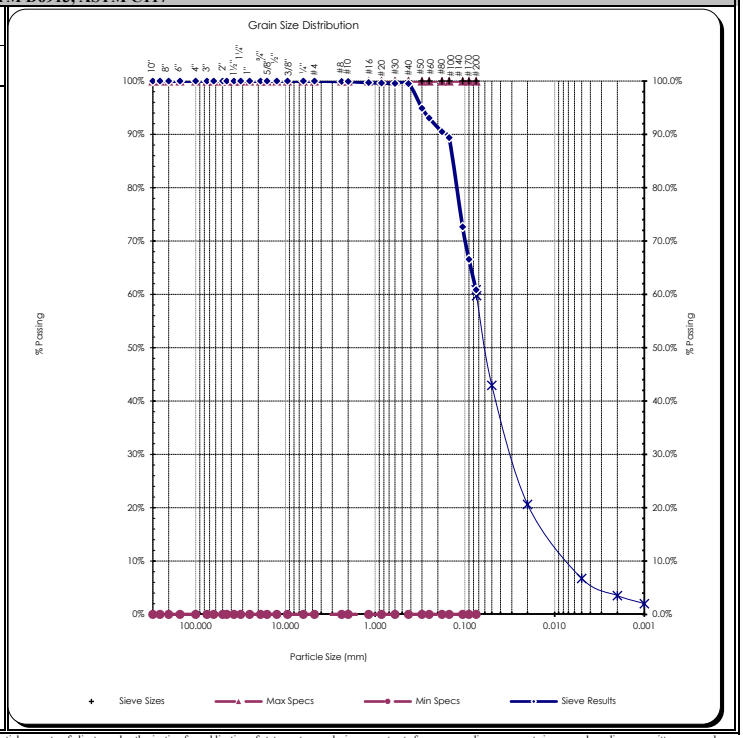
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.003	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C =	3.28
$D_{(10)}$ =	0.008	mm	% Sand =	39.1%	Coeff. of Uniformity, C_U =	9.69
$D_{(15)}$ =	0.013	mm	% Silt & Clay =	60.9%	Fineness Modulus =	0.16
$D_{(30)}$ =	0.043	mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.065	mm	Plasticity Index =	n/a	Moisture %, as sampled =	34.2%
$D_{(60)}$ =	0.074	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	0.167	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	11/18		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850		100%	100.0%	0.0%
#30	0.600		100%	100.0%	0.0%
#40	0.425	100%	100%	100.0%	0.0%
#50	0.300		95%	100.0%	0.0%
#60	0.250		93%	100.0%	0.0%
#80	0.180		90%	100.0%	0.0%
#100	0.150	89%	89%	100.0%	0.0%
#140	0.106		73%	100.0%	0.0%
#170	0.090		67%	100.0%	0.0%
#200	0.075	60.9%	60.9%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	25-Sep-21
Source:	LDW21-GT25-GB-26-28.5 ft	**Tested By:**	K. Mendez
Sample#:	B21-1820		

Visual Identification
Sandy Silt with Clay
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr :	2.61	
Sample Weight:	75.00	grams
Hydroscopic Moist.:	10.50%	
Adj. Sample Wgt :	67.87	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	22	32.7%	0.0494 mm
2	18	26.8%	0.0357 mm
5	15.5	23.0%	0.0230 mm
15	10.5	15.6%	0.0137 mm
30	9	13.4%	0.0097 mm
60	6	8.9%	0.0070 mm
240	3.5	5.2%	0.0036 mm
1440	2	3.0%	0.0015 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	39.1%	**Plastic Limit:**	n/a
% Silt:	54.1%	**Plasticity Index:**	n/a
% Clay:	6.8%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	100%	0.850 mm
#40	100%	0.425 mm
#100	89%	0.150 mm
#200	60.9%	0.075 mm
Silts	59.8%	0.074 mm
	42.9%	0.050 mm
	20.6%	0.020 mm
Clays	6.8%	0.005 mm
	3.5%	0.002 mm
Colloids	2.0%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sandy Loam

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA, LLC	**Date Tested:**	25-Sep-21
Source:	LDW21-GT33-GB-0-10.4 ft	**Tested By:**	K. Mendez
Sample #:	B21-1823		

Visual Identification
Silt with Clay
Sample Color
brown

Liquid Limit Determination

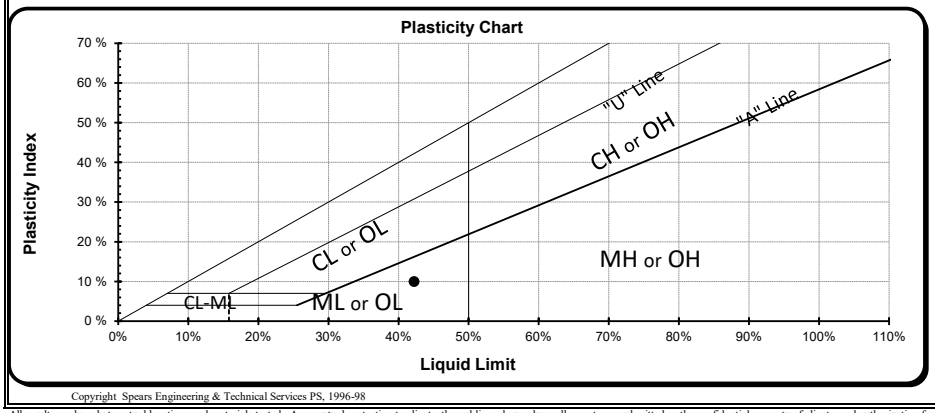
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	28.38	32.44	32.76			
Weight of Dry Soils + Pan:	24.50	28.64	28.74			
Weight of Pan:	15.01	19.79	19.63			
Weight of Dry Soils:	9.49	8.85	9.11			
Weight of Moisture:	3.88	3.80	4.02			
% Moisture:	40.9 %	42.9 %	44.1 %			
Number of Blows:	32	21	15			

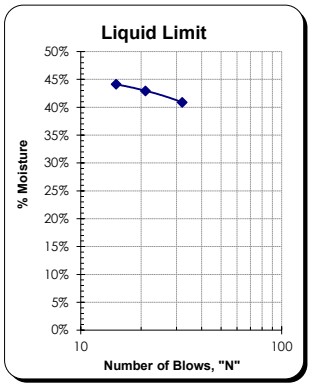
Liquid Limit @ 25 Blows: 42 %
Plastic Limit: 32 %
Plasticity Index, I_P: 10 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	35.43	35.12				
Weight of Dry Soils + Pan:	33.78	33.45				
Weight of Pan:	28.65	28.27				
Weight of Dry Soils:	5.13	5.18				
Weight of Moisture:	1.65	1.67				
% Moisture:	32.2 %	32.2 %				

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: _____

Reviewed by: _____
Meghan Blodgett-Carrillo

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT33-GB-11-18.5 ft
Sample#: B21-1825

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 25-Sep-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

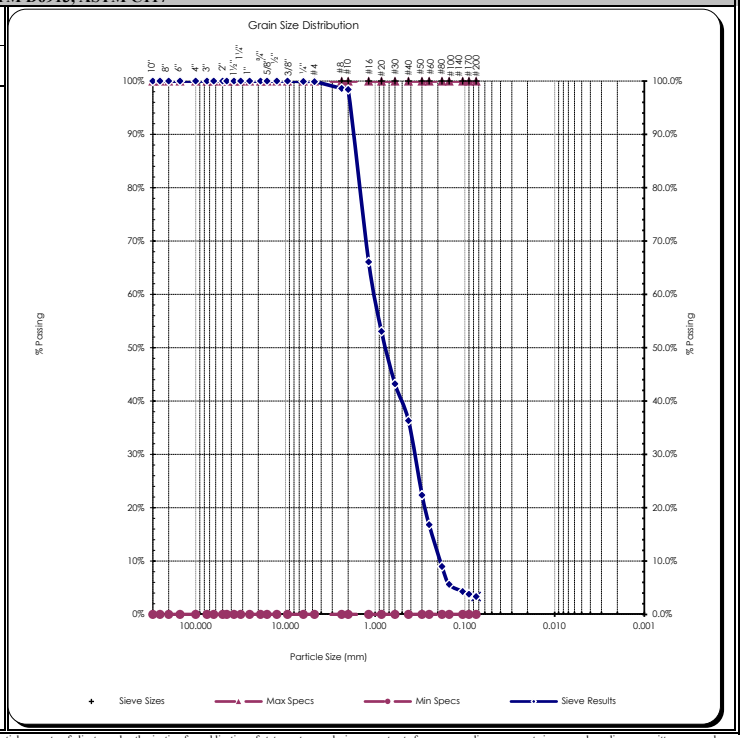
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.128	mm	% Gravel =	0.1%	Coeff. of Curvature, C_C = 0.70
$D_{(10)}$ =	0.189	mm	% Sand =	96.5%	Coeff. of Uniformity, C_U = 5.43
$D_{(15)}$ =	0.234	mm	% Silt & Clay =	3.4%	Fineness Modulus = 2.64
$D_{(30)}$ =	0.368	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.772	mm	Plasticity Index =	n/a	Moisture %, as sampled = 22.2%
$D_{(60)}$ =	1.025	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.786	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	5/54		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	98%	98%	100.0%	0.0%
#16	1.18		66%	100.0%	0.0%
#20	0.850		53%	100.0%	0.0%
#30	0.600		43%	100.0%	0.0%
#40	0.425	36%	36%	100.0%	0.0%
#50	0.300		22%	100.0%	0.0%
#60	0.250		17%	100.0%	0.0%
#80	0.180		9%	100.0%	0.0%
#100	0.150	6%	6%	100.0%	0.0%
#140	0.106		4%	100.0%	0.0%
#170	0.090		4%	100.0%	0.0%
#200	0.075	3.4%	3.4%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

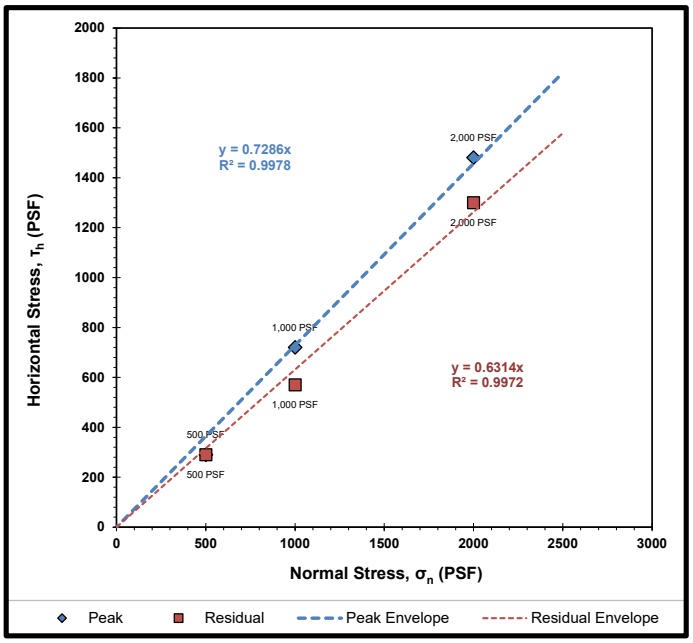
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT33-GB-11-18.5 ft
Laboratory Sample ID:	B21-1825	**Visual Soil Description:**	brown sand with silt
Sample Date:	7/15/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	10/1/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	27.4	
	Initial	**Post-Consolidation**
Dry Density (PCF):	105.9	106.9
Void Ratio:	0.591	0.577
Porosity (%):	37.2	36.6
Degree of Saturation (%):	saturated	saturated

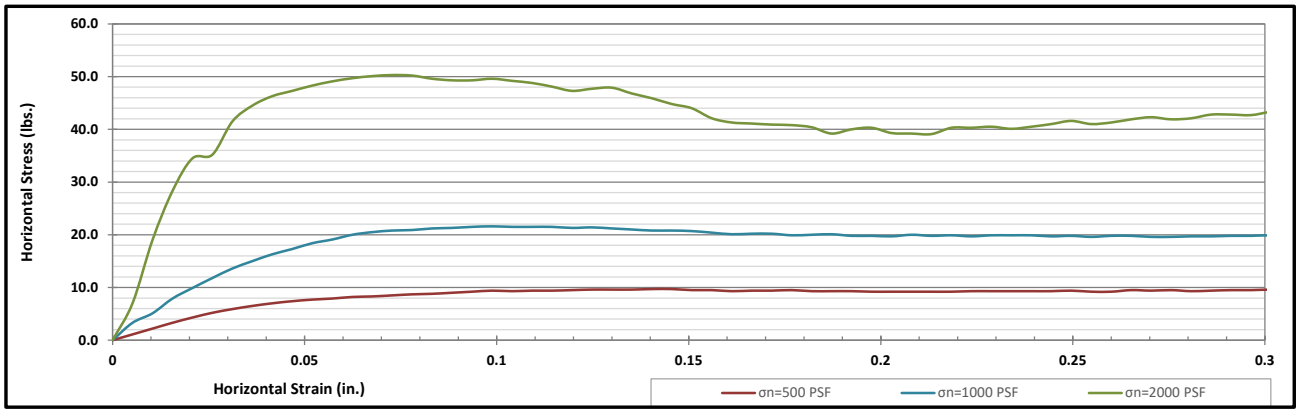
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	27.4	
	Initial	**Post-Consolidation**
Dry Density (PCF):	106.2	107.7
Void Ratio:	0.586	0.564
Porosity (%):	36.9	36.1
Degree of Saturation (%):	saturated	saturated

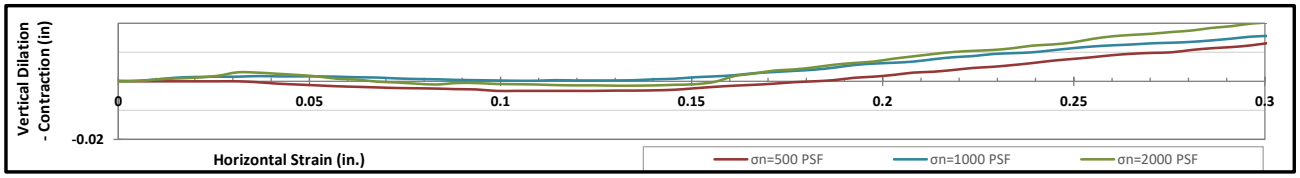
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	26.6	
	Initial	**Post-Consolidation**
Dry Density (PCF):	106.1	108.6
Void Ratio:	0.589	0.551
Porosity (%):	37.0	35.5
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**38**	**32**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	290	720	1480
Residual Horizontal Stress, τ_h (PSF):	290	570	1300





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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA, LLC
Source: ~~LDW21-GT25-GB-18.3-21 ft~~
Sample #: B21-1826

NAME CORRECTION:
LDW21-GT33-18.5-21

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 25-Sep-21
Tested By: K. Mendez

Visual Identification
Silty Sand
Sample Color
brown

Liquid Limit Determination

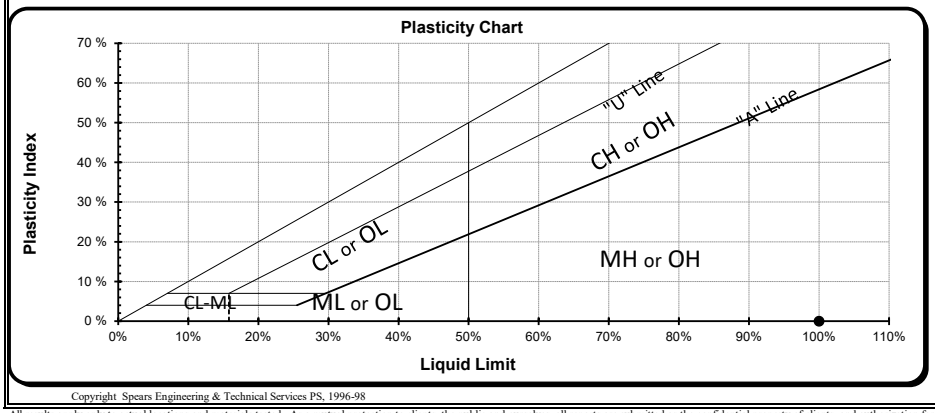
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Unable to esablish liquid limit					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

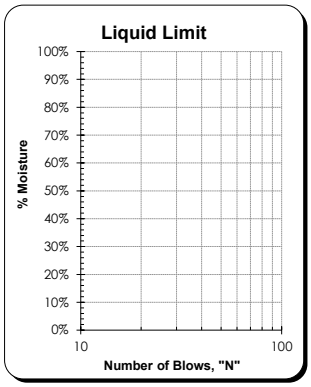
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Cannot determined plastic limit					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT33-GB-21-26.8 ft
Sample#: B21-1828

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 25-Sep-21
Tested By: K. Mendez

Unified Soils Classification System, ASTM D-2487
ML, Sandy Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

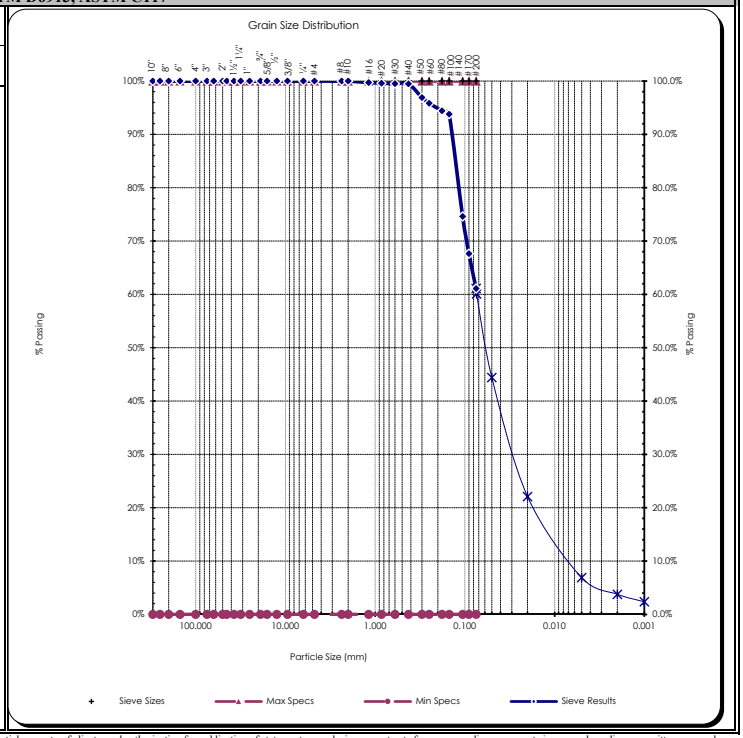
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.004	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 2.51
$D_{(10)}$ =	0.007	mm	% Sand =	38.9%	Coeff. of Uniformity, C_U = 10.39
$D_{(15)}$ =	0.010	mm	% Silt & Clay =	61.1%	Fineness Modulus = 0.10
$D_{(30)}$ =	0.036	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.064	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 34.4%
$D_{(60)}$ =	0.074	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.141	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	43/70		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850		100%	100.0%	0.0%
#30	0.600		100%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		97%	100.0%	0.0%
#60	0.250		96%	100.0%	0.0%
#80	0.180		94%	100.0%	0.0%
#100	0.150	94%	94%	100.0%	0.0%
#140	0.106		75%	100.0%	0.0%
#170	0.090		68%	100.0%	0.0%
#200	0.075	61.1%	61.1%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	25-Sep-21
Source:	LDW21-GT33-GB-21-26.8 ft	**Tested By:**	K. Mendez
Sample#:	B21-1828		

Unified Soils Classification System, ASTM D-2487
ML, Sandy Silt
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	75.85	grams
Hydroscopic Moist.:	3.68%	
Adj. Sample Wgt :	73.16	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	25	34.2%	0.0477 mm
2	21.5	29.4%	0.0347 mm
5	17.5	23.9%	0.0224 mm
15	12.5	17.1%	0.0133 mm
30	10.5	14.4%	0.0096 mm
60	7	9.6%	0.0069 mm
240	3.5	4.8%	0.0035 mm
1440	2.5	3.4%	0.0014 mm

% Gravel:	0.0%	**Liquid Limit:**	0.0 %
% Sand:	38.9%	**Plastic Limit:**	0.0 %
% Silt:	54.2%	**Plasticity Index:**	0.0 %
% Clay:	6.9%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	100%	0.850 mm
#40	99%	0.425 mm
#100	94%	0.150 mm
#200	61.1%	0.075 mm
Silts	60.1%	0.074 mm
	44.4%	0.050 mm
	22.1%	0.020 mm
Clays	6.9%	0.005 mm
	3.8%	0.002 mm
Colloids	2.4%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sandy Loam

Comments:

Reviewed by: Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA, LLC	**Date Tested:**	25-Sep-21
Source:	LDW21-GT33-GB-21-26.8 ft	**Tested By:**	K. Mendez
Sample #:	B21-1828		

Unified Soils Classification System, ASTM D-2487
ML, Sandy Silt
Sample Color
brown

Liquid Limit Determination

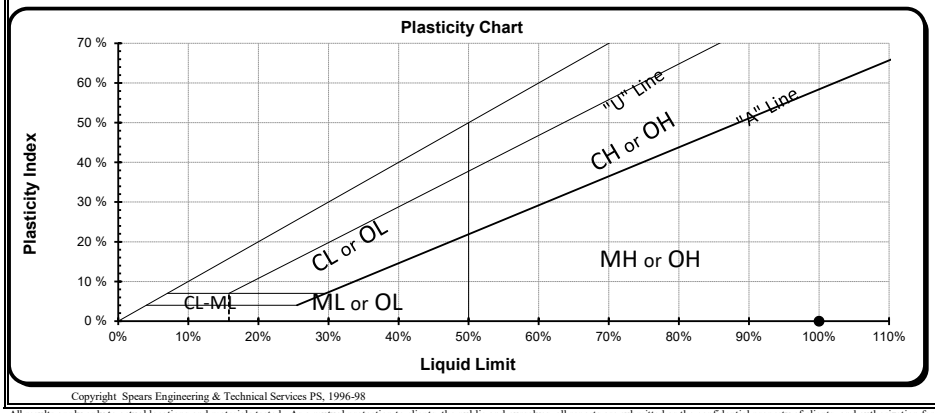
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Unable to esablish liquid limit					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

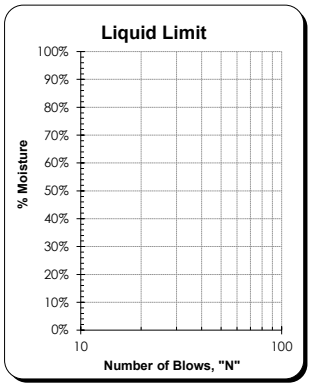
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Cannot determined plastic limit					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA, LLC	**Date Tested:**	25-Sep-21
Source:	LDW21-GT33-GB-26.8-28.8 ft	**Tested By:**	K. Mendez
Sample #:	B21-1829		

Visual Identification
Silty Sand
Sample Color
brown

Liquid Limit Determination

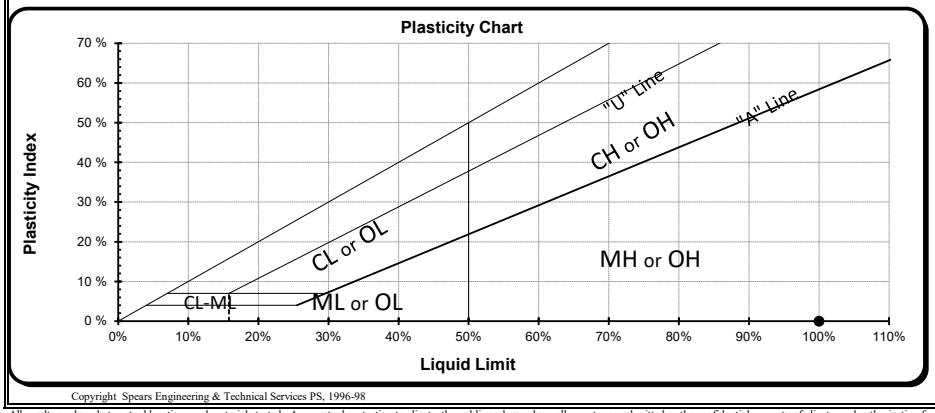
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Unable to esablish liquid limit					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

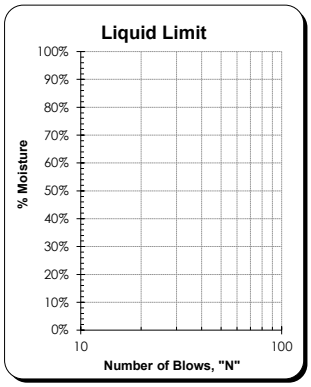
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Cannot determined plastic limit					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT33-GB-28.8-29.5 ft
Sample#: B21-1830

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 25-Sep-21
Tested By: K. Mendez

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

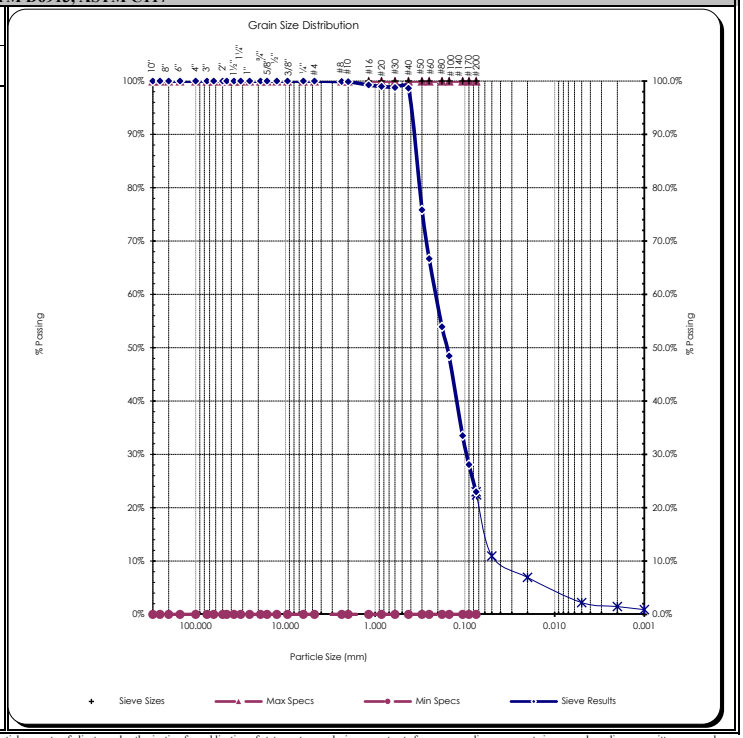
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.010	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 0.90
$D_{(10)}$ =	0.047	mm	% Sand =	77.0%	Coeff. of Uniformity, C_U = 4.50
$D_{(15)}$ =	0.061	mm	% Silt & Clay =	23.0%	Fineness Modulus = 0.78
$D_{(30)}$ =	0.096	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.158	mm	Plasticity Index =	n/a	Moisture %, as sampled = 33.6%
$D_{(60)}$ =	0.213	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.378	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	7/30		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		76%	100.0%	0.0%
#60	0.250		67%	100.0%	0.0%
#80	0.180		54%	100.0%	0.0%
#100	0.150	48%	48%	100.0%	0.0%
#140	0.106		34%	100.0%	0.0%
#170	0.090		28%	100.0%	0.0%
#200	0.075	23.0%	23.0%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	25-Sep-21
Source:	LDW21-GT33-GB-28.8-29.5 ft	**Tested By:**	K. Mendez
Sample#:	B21-1830		

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	80.02	grams
Hydroscopic Moist.:	4.80%	
Adj. Sample Wgt :	76.35	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	8	10.5%	0.0529 mm
2	7	9.2%	0.0376 mm
5	5.5	7.2%	0.0240 mm
15	5	6.5%	0.0139 mm
30	4	5.2%	0.0098 mm
60	2	2.6%	0.0070 mm
240	1.5	2.0%	0.0035 mm
1440	1	1.3%	0.0014 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	77.0%	**Plastic Limit:**	n/a
% Silt:	20.8%	**Plasticity Index:**	n/a
% Clay:	2.2%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	99%	0.850 mm
#40	99%	0.425 mm
#100	48%	0.150 mm
#200	23.0%	0.075 mm
Silts	22.4%	0.074 mm
	10.9%	0.050 mm
	6.9%	0.020 mm
Clays	2.2%	0.005 mm
	1.5%	0.002 mm
Colloids	0.9%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sand

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA, LLC	**Date Tested:**	25-Sep-21
Source:	LDW21-GT33-GB-29.5-31 ft	**Tested By:**	K. Mendez
Sample #:	B21-1831		

Visual Identification
Sandy Silt
Sample Color
brown

Liquid Limit Determination

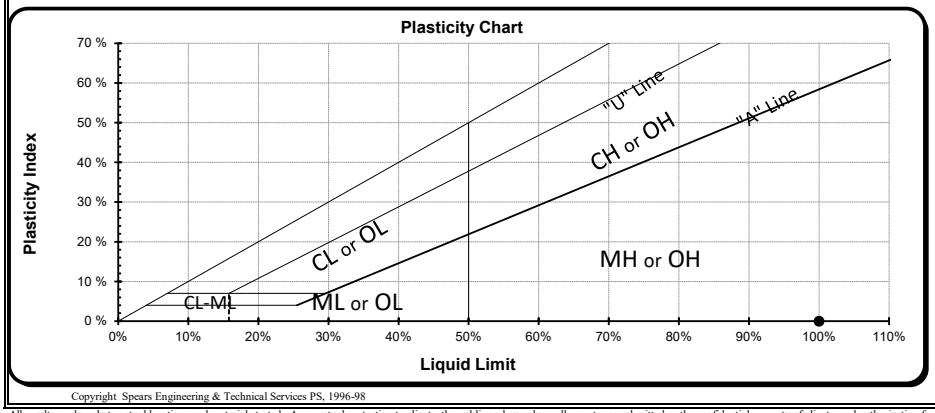
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Unable to esablish liquid limit				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

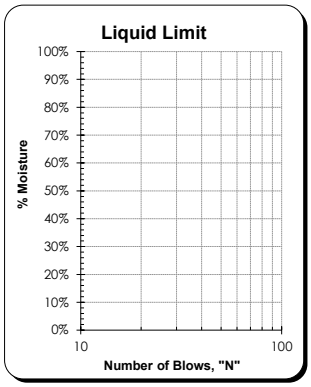
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Cannot determined plastic limit				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

Client:	Anchor QEA	**Date:**	October 19, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-1948 - 1965
Revised on:		**Date sampled:**	July 16, 2021

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Date Received: July 29, 2021
Date Tested: October 1, 2021

Client: Anchor QEA
Sampled by: Client
Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1948	LDW21-GT39-GB-0-1.5 ft	182.2	359.3	304.7	54.6	122.5	44.6%
B21-1949	LDW21-GT39-GB-0-8.8 ft	229.5	1120.6	890.6	230.0	661.1	34.8%
B21-1950	LDW21-GT39-GB-8.8-10.5 ft	234.3	1839.1	1517.6	321.5	1283.3	25.1%
B21-1951	LDW21-GT39-GB-10.5-12 ft	222.9	1270.1	1072.1	198.0	849.2	23.3%
B21-1952	LDW21-GT39-GB-10.5-20.5 ft	228.8	652.9	584.6	68.3	355.8	19.2%
B21-1953	LDW21-GT39-GB-20.5-21 ft	225.2	577.3	508.6	68.7	283.4	24.2%
B21-1954	LDW21-GT39-GB-20.5-30.5 ft	234.4	1327.0	1148.4	178.6	914.0	19.5%
B21-1955	LDW21-GT39-GB-30.5-32 ft	233.2	876.4	747.6	128.8	514.4	25.0%
B21-1956	LDW21-GT23-GB-0-1.5 ft	223.0	462.7	361.7	101.0	138.7	72.8%
B21-1957	LDW21-GT23-GB-0-8.2 ft	221.9	900.9	625.0	275.9	403.1	68.4%
B21-1958	LDW21-GT23-GB-8.5-10 ft	215.4	919.5	775.8	143.7	560.4	25.6%
B21-1959	LDW21-GT23-GB-8.5-17.6 ft	234.7	1060.0	934.4	125.6	699.7	18.0%
B21-1960	LDW21-GT23-GB-17.6-18.5 ft	217.3	972.1	771.5	200.6	554.2	36.2%
B21-1961	LDW21-GT23-GB-18.5-20 ft	270.1	687.9	581.4	106.5	311.3	34.2%
B21-1962	LDW21-GT23-GB-21.1-22.8 ft	222.3	1022.4	815.3	207.1	593.0	34.9%
B21-1963	LDW21-GT23-GB-22.8-26.8 ft	266.3	870.9	724.1	146.8	457.8	32.1%
B21-1964	LDW21-GT23-GB-27.7-28.5 ft	224.7	963.8	779.9	183.9	555.2	33.1%
B21-1965	LDW21-GT23-GB-30.5-32 ft	235.2	627.7	539.1	88.6	303.9	29.2%

Reviewed by: Meghan Blodgett-Carrillo

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: September 20, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-1952	LDW21-GT39-GB-10.5-20.5 ft	493.16	568.87	75.7	TSA-014	192.3	499.5	0.99858	738.22	691.08	18.1	2.6499101	1.00037	2.6508905
B21-1957	LDW21-GT23-GB-0-8.2 ft	584.01	660.92	76.9	TSA-013	184.0	499.7	0.99858	729.36	682.95	18.1	2.5216018	1.00037	2.5225348

Reviewed by:
Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA, LLC	**Date Tested:**	6-Oct-21
Source:	LDW21-GT39-GB-0-8.8 ft	**Tested By:**	C. Kriss
Sample #:	B21-1949		

Visual Identification
Silt with Sand
Sample Color
brown

Liquid Limit Determination

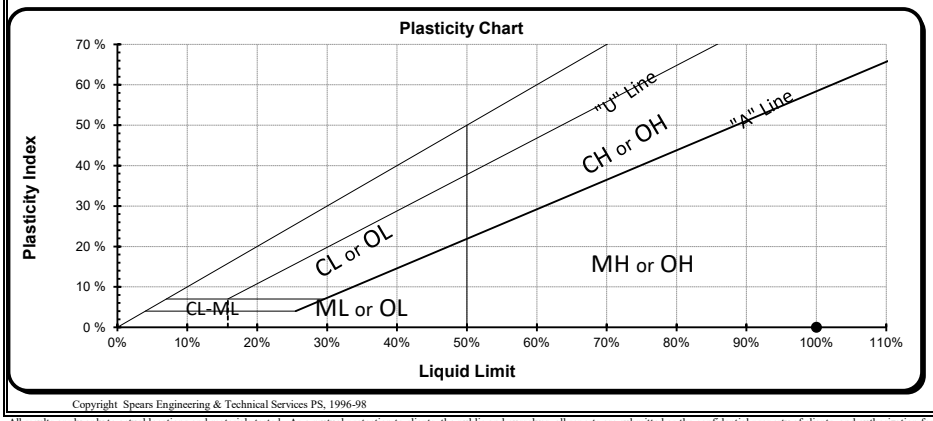
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Unable to determine				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

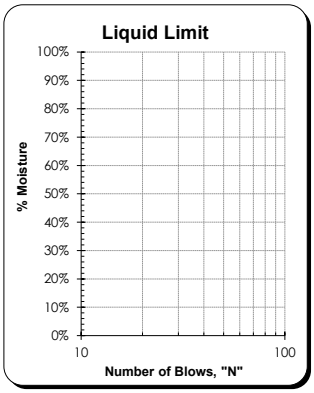
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Unable to establish				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be determined as the material displays rapid dilation. At lower moistures the sample does not spread into the cup without tearing the soil cake. Unable to establish plastic limit as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT39-GB-8.8-10.5 ft
Sample#: B21-1950

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 4-Oct-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
grayish-brown

ACCREDITED
Certificate #: 1366.01

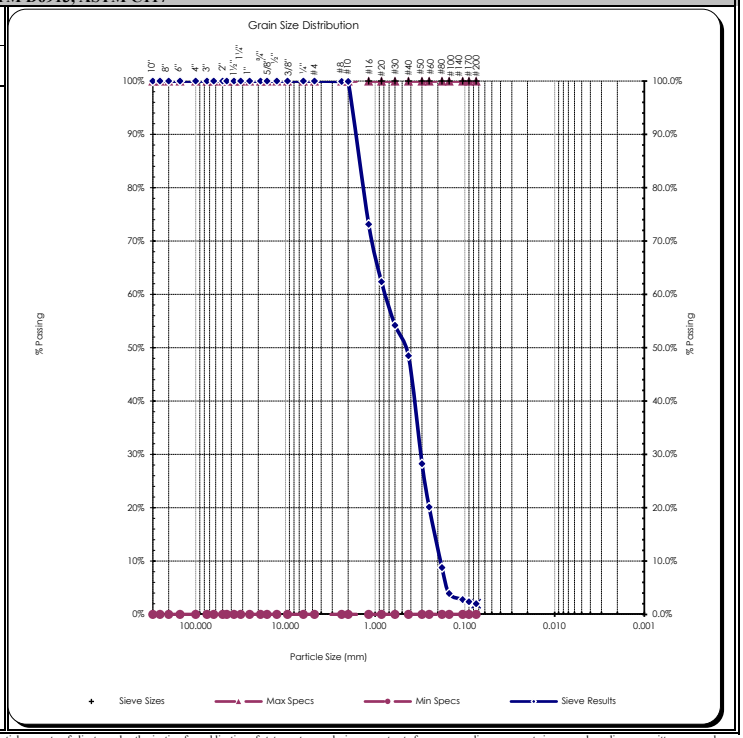
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.157	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 0.66
$D_{(10)}$ =	0.187	mm	% Sand =	98.0%	Coeff. of Uniformity, C_U = 4.15
$D_{(15)}$ =	0.218	mm	% Silt & Clay =	2.0%	Fineness Modulus = 2.40
$D_{(30)}$ =	0.311	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.471	mm	Plasticity Index =	n/a	Moisture %, as sampled = 25.0%
$D_{(60)}$ =	0.777	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.696	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	1/24		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		73%	100.0%	0.0%
#20	0.850		62%	100.0%	0.0%
#30	0.600		54%	100.0%	0.0%
#40	0.425	49%	49%	100.0%	0.0%
#50	0.300		28%	100.0%	0.0%
#60	0.250		20%	100.0%	0.0%
#80	0.180		9%	100.0%	0.0%
#100	0.150	4%	4%	100.0%	0.0%
#140	0.106		3%	100.0%	0.0%
#170	0.090		2%	100.0%	0.0%
#200	0.075	2.0%	2.0%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT39-GB-10.5-20.5 ft
Sample#: B21-1952

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 4-Oct-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
grayish-brown

ACCREDITED
Certificate #: 1366.01

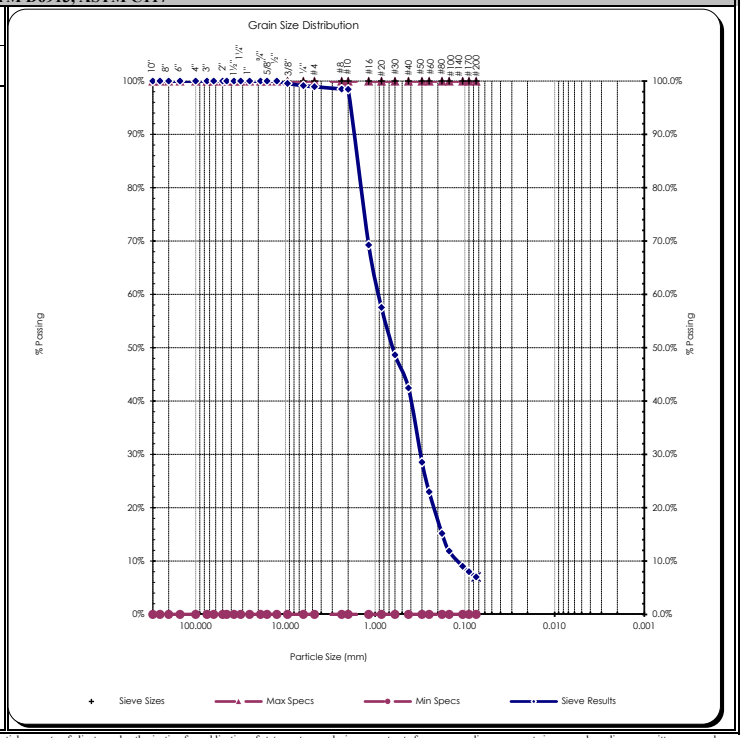
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.053	mm	% Gravel =	1.1%	Coeff. of Curvature, C_C = 0.88
$D_{(10)}$ =	0.121	mm	% Sand =	91.9%	Coeff. of Uniformity, C_U = 7.60
$D_{(15)}$ =	0.178	mm	% Silt & Clay =	7.0%	Fineness Modulus = 2.45
$D_{(30)}$ =	0.313	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.638	mm	Plasticity Index =	n/a	Moisture %, as sampled = 19.2%
$D_{(60)}$ =	0.919	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.762	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	1/6		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	98%	98%	100.0%	0.0%
#16	1.18		69%	100.0%	0.0%
#20	0.850		58%	100.0%	0.0%
#30	0.600		49%	100.0%	0.0%
#40	0.425	42%	42%	100.0%	0.0%
#50	0.300		29%	100.0%	0.0%
#60	0.250		23%	100.0%	0.0%
#80	0.180		15%	100.0%	0.0%
#100	0.150	12%	12%	100.0%	0.0%
#140	0.106		9%	100.0%	0.0%
#170	0.090		8%	100.0%	0.0%
#200	0.075	7.0%	7.0%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

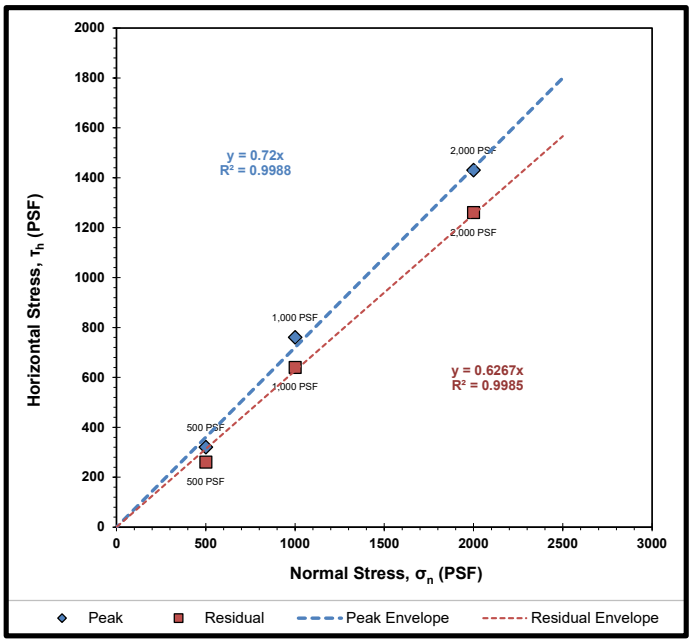
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT39-GB-10.5-20.5 ft
Laboratory Sample ID:	B21-1952	**Visual Soil Description:**	grayish-brown sand
Sample Date:	7/16/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	10/4/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	26.0	
	Initial	**Post-Consolidation**
Dry Density (PCF):	109.4	111.1
Void Ratio:	0.540	0.516
Porosity (%):	35.1	34.0
Degree of Saturation (%):	saturated	saturated

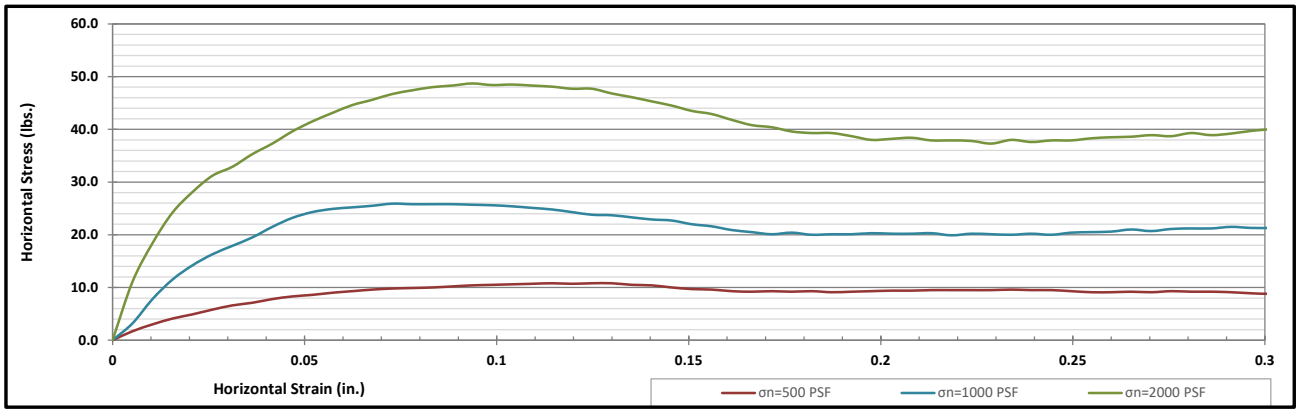
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	26.7	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.4	109.6
Void Ratio:	0.569	0.537
Porosity (%):	36.3	34.9
Degree of Saturation (%):	saturated	saturated

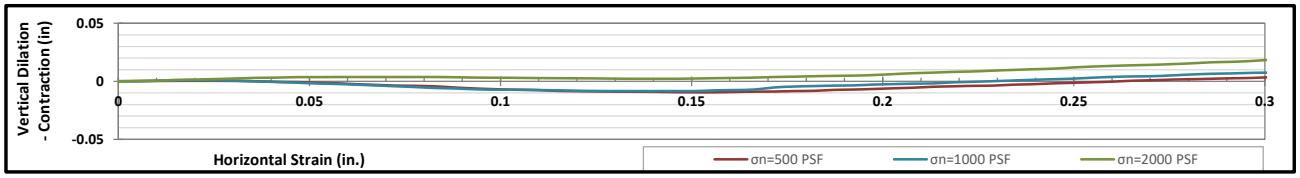
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	25.2	
	Initial	**Post-Consolidation**
Dry Density (PCF):	109.0	113.2
Void Ratio:	0.546	0.488
Porosity (%):	35.3	32.8
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**36**	**32**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	320	760	1430
Residual Horizontal Stress, τ_h (PSF):	260	640	1260





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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT39-GB-20.5-30.5 ft
Sample#: B21-1954

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 4-Oct-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
gray

ACCREDITED
Certificate #: 1366.01

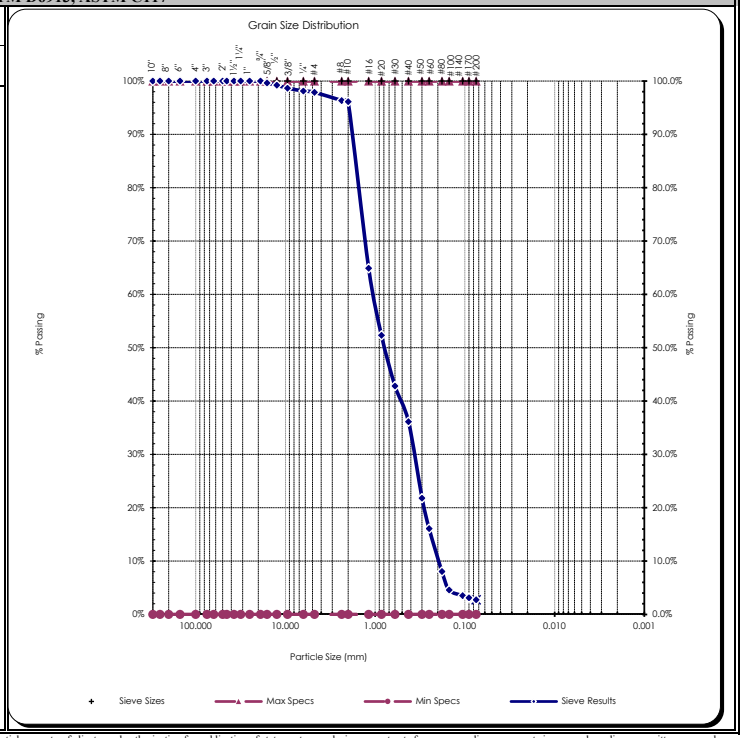
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.153	mm	% Gravel =	2.1%	Coeff. of Curvature, C_C = 0.67
$D_{(10)}$ =	0.197	mm	% Sand =	95.1%	Coeff. of Uniformity, C_U = 5.34
$D_{(15)}$ =	0.241	mm	% Silt & Clay =	2.8%	Fineness Modulus = 2.73
$D_{(30)}$ =	0.371	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.789	mm	Plasticity Index =	n/a	Moisture %, as sampled = 19.5%
$D_{(60)}$ =	1.051	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.839	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	1/13		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	99%	99%	100.0%	0.0%
3/8"	9.50	99%	99%	100.0%	0.0%
1/4"	6.30		98%	100.0%	0.0%
#4	4.75	98%	98%	100.0%	0.0%
#8	2.36		96%	100.0%	0.0%
#10	2.00	96%	96%	100.0%	0.0%
#16	1.18		65%	100.0%	0.0%
#20	0.850		52%	100.0%	0.0%
#30	0.600		43%	100.0%	0.0%
#40	0.425	36%	36%	100.0%	0.0%
#50	0.300		22%	100.0%	0.0%
#60	0.250		16%	100.0%	0.0%
#80	0.180		8%	100.0%	0.0%
#100	0.150	5%	5%	100.0%	0.0%
#140	0.106		4%	100.0%	0.0%
#170	0.090		3%	100.0%	0.0%
#200	0.075	2.8%	2.8%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA, LLC	**Date Tested:**	6-Oct-21
Source:	LDW21-GT23-GB-0-8.2 ft	**Tested By:**	C. Kriss
Sample #:	B21-1957		

Visual Identification
Silt with Sand
Sample Color
brown

Liquid Limit Determination

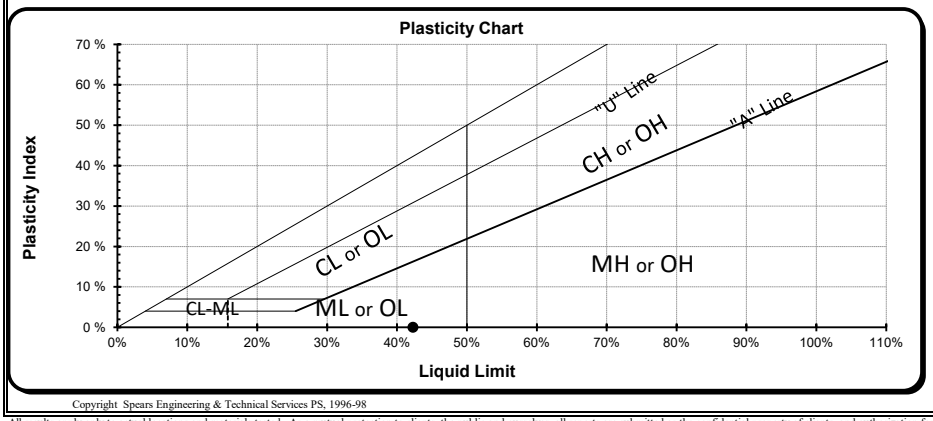
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	33.87	31.07	35.40			
Weight of Dry Soils + Pan:	29.74	27.66	30.53			
Weight of Pan:	19.98	19.72	19.51			
Weight of Dry Soils:	9.76	7.94	11.02			
Weight of Moisture:	4.13	3.41	4.87			
% Moisture:	42.3 %	43.0 %	44.2 %			
Number of Blows:	25	20	13			

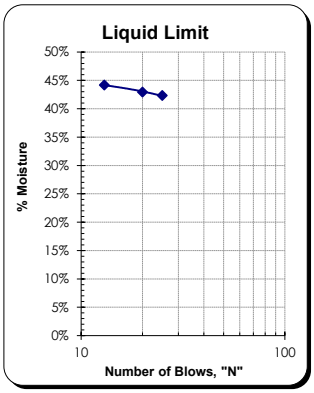
Liquid Limit @ 25 Blows: 42 %
Plastic Limit: N/A
Plasticity Index, I_p: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Unable to establish				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Unable to establish plastic limit as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT23-GB-8.5-17.6 ft
Sample#: B21-1959

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 4-Oct-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
grayish-brown

ACCREDITED
Certificate #: 1366.01

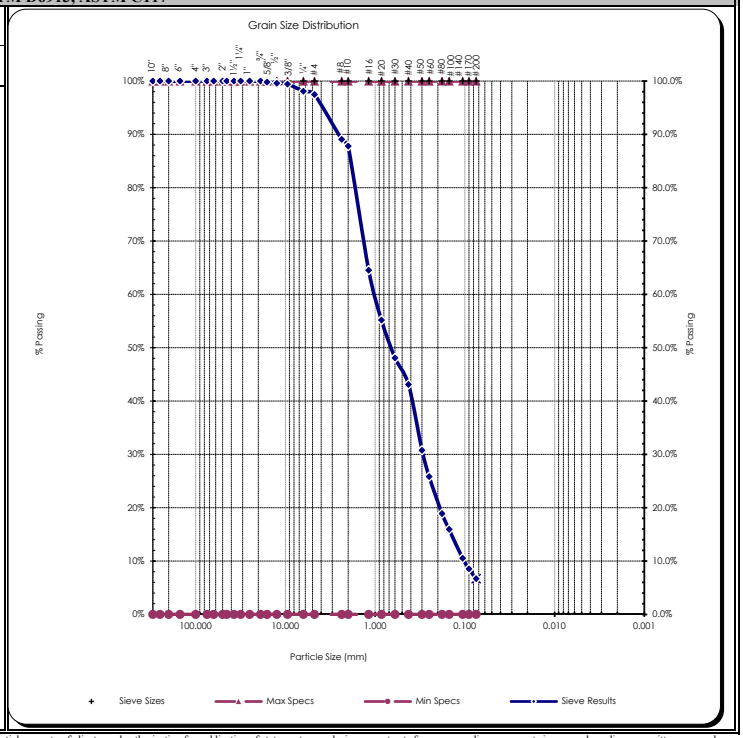
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.056	mm	% Gravel =	2.5%	Coeff. of Curvature, C_C =	0.82
$D_{(10)}$ =	0.102	mm	% Sand =	90.8%	Coeff. of Uniformity, C_U =	10.03
$D_{(15)}$ =	0.142	mm	% Silt & Clay =	6.7%	Fineness Modulus =	2.55
$D_{(30)}$ =	0.292	mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.667	mm	Plasticity Index =	n/a	Moisture %, as sampled =	18.0%
$D_{(60)}$ =	1.020	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	2.624	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	7/45		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	99%	99%	100.0%	0.0%
1/4"	6.30		98%	100.0%	0.0%
#4	4.75	97%	97%	100.0%	0.0%
#8	2.36		89%	100.0%	0.0%
#10	2.00	88%	88%	100.0%	0.0%
#16	1.18		65%	100.0%	0.0%
#20	0.850		55%	100.0%	0.0%
#30	0.600		48%	100.0%	0.0%
#40	0.425	43%	43%	100.0%	0.0%
#50	0.300		31%	100.0%	0.0%
#60	0.250		26%	100.0%	0.0%
#80	0.180		19%	100.0%	0.0%
#100	0.150	16%	16%	100.0%	0.0%
#140	0.106		11%	100.0%	0.0%
#170	0.090		9%	100.0%	0.0%
#200	0.075	6.7%	6.7%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

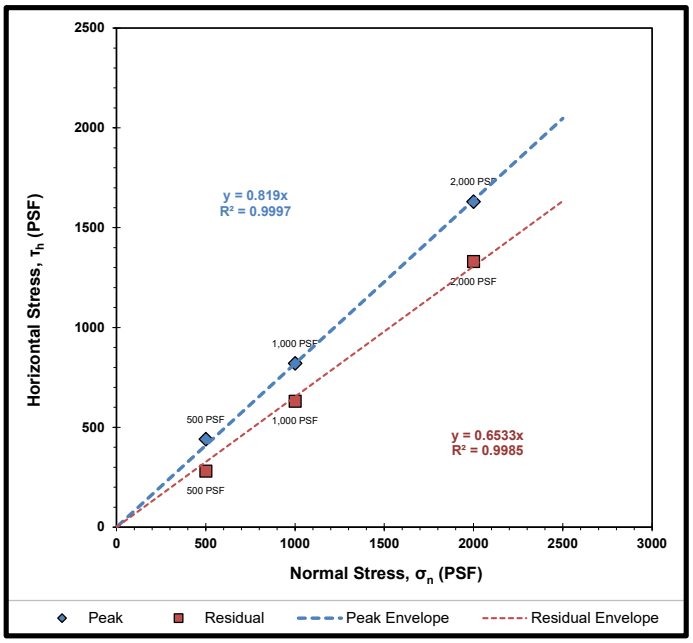
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT23-GB-8.5-17.6 ft
Laboratory Sample ID:	B21-1959	**Visual Soil Description:**	grayish-brown sand
Sample Date:	7/16/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	10/5/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		**σ_n=500 PSF**
Initial Moisture Content (%):	22.6	
	Initial	**Post-Consolidation**
Dry Density (PCF):	109.4	111.1
Void Ratio:	0.539	0.517
Porosity (%):	35.0	34.1
Degree of Saturation (%):	saturated	saturated

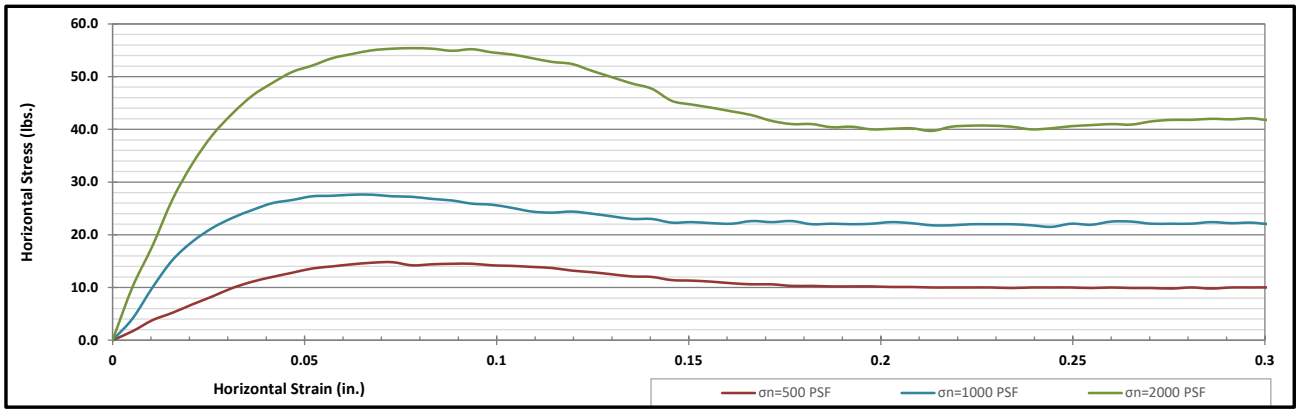
Summary of Sample Data:		**σ_n=1000 PSF**
Initial Moisture Content (%):	22.2	
	Initial	**Post-Consolidation**
Dry Density (PCF):	110.1	111.8
Void Ratio:	0.531	0.507
Porosity (%):	34.7	33.7
Degree of Saturation (%):	saturated	saturated

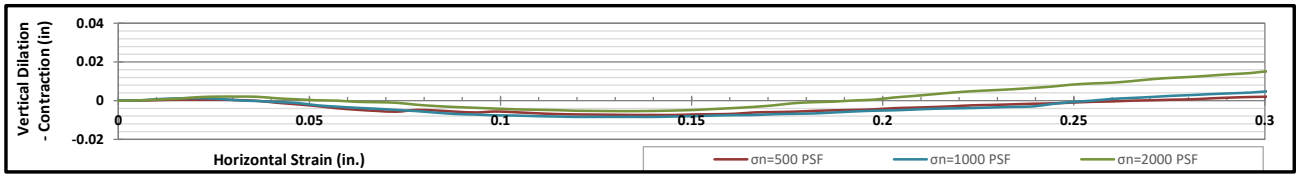
Summary of Sample Data:		**σ_n=2000 PSF**
Initial Moisture Content (%):	23.3	
	Initial	**Post-Consolidation**
Dry Density (PCF):	109.0	114.1
Void Ratio:	0.545	0.476
Porosity (%):	35.3	32.3
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS		
	PEAK	**RESIDUAL**
Angle of Internal Friction, ϕ (°):	**39**	**33**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	440	820	1630
Residual Horizontal Stress, τ_h (PSF):	280	630	1330





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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT23-GB-17.6-18.5 ft
Sample#: B21-1960

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 4-Oct-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
grayish-brown

ACCREDITED
Certificate #: 1366.01

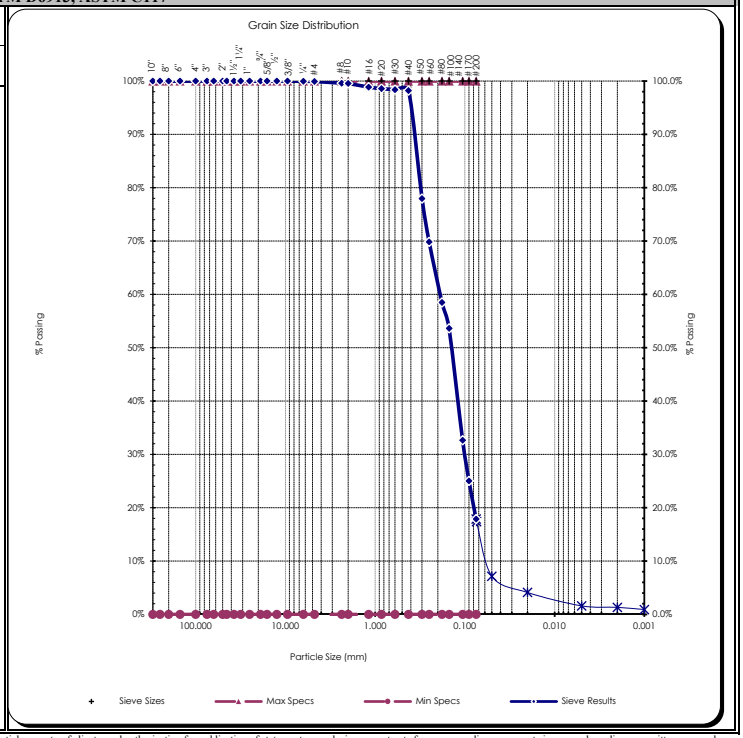
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.028	mm	% Gravel =	0.1%	Coeff. of Curvature, C_C = 0.90
$D_{(10)}$ =	0.059	mm	% Sand =	82.0%	Coeff. of Uniformity, C_U = 3.20
$D_{(15)}$ =	0.069	mm	% Silt & Clay =	17.9%	Fineness Modulus = 0.72
$D_{(30)}$ =	0.100	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.142	mm	Plasticity Index =	n/a	Moisture %, as sampled = 36.2%
$D_{(60)}$ =	0.189	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.374	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	2/11		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		98%	100.0%	0.0%
#40	0.425	98%	98%	100.0%	0.0%
#50	0.300		78%	100.0%	0.0%
#60	0.250		70%	100.0%	0.0%
#80	0.180		59%	100.0%	0.0%
#100	0.150	54%	54%	100.0%	0.0%
#140	0.106		33%	100.0%	0.0%
#170	0.090		25%	100.0%	0.0%
#200	0.075	17.9%	17.9%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	4-Oct-21
Source:	LDW21-GT23-GB-17.6-18.5 ft	**Tested By:**	K. Mendez
Sample#:	B21-1960		

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color
grayish-brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	75.28	grams
Hydroscopic Moist.:	1.16%	
Adj. Sample Wgt :	74.42	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	5.5	7.4%	0.0537 mm
2	4.5	6.0%	0.0381 mm
5	3.5	4.7%	0.0243 mm
15	2.5	3.3%	0.0141 mm
30	2	2.7%	0.0100 mm
60	1.5	2.0%	0.0071 mm
240	1	1.3%	0.0035 mm
1440	1	1.3%	0.0014 mm

% Gravel:	0.1%	**Liquid Limit:**	n/a
% Sand:	82.0%	**Plastic Limit:**	n/a
% Silt:	16.3%	**Plasticity Index:**	n/a
% Clay:	1.6%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	99%	0.850 mm
#40	98%	0.425 mm
#100	54%	0.150 mm
#200	17.9%	0.075 mm
Silts	17.4%	0.074 mm
	7.2%	0.050 mm
	4.1%	0.020 mm
Clays	1.6%	0.005 mm
	1.3%	0.002 mm
Colloids	0.9%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sand

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA, LLC	**Date Tested:**	6-Oct-21
Source:	LDW21-GT23-GB-21.1-22.8 ft	**Tested By:**	C. Kriss
Sample #:	B21-1962		

Visual Identification
Sandy Silt
Sample Color
brown

Liquid Limit Determination

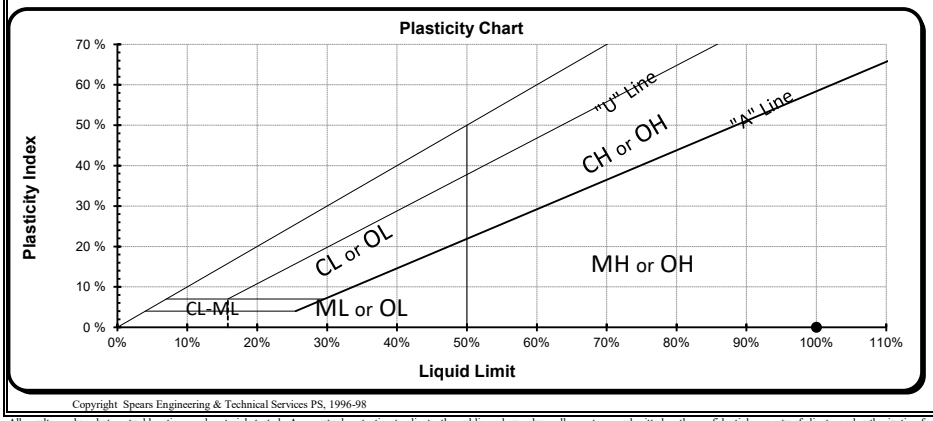
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Unable to determine				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

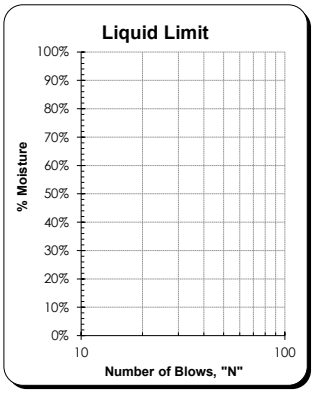
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_p: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Unable to establish				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be determined as the material displays rapid dilation. At lower moistures the sample does not spread into the cup without tearing the soil cake. Unable to establish plastic limit as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974

Visit our website: www.mtc-inc.net

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT23-GB-22.8-26.8 ft
Sample#: B21-1963

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 4-Oct-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

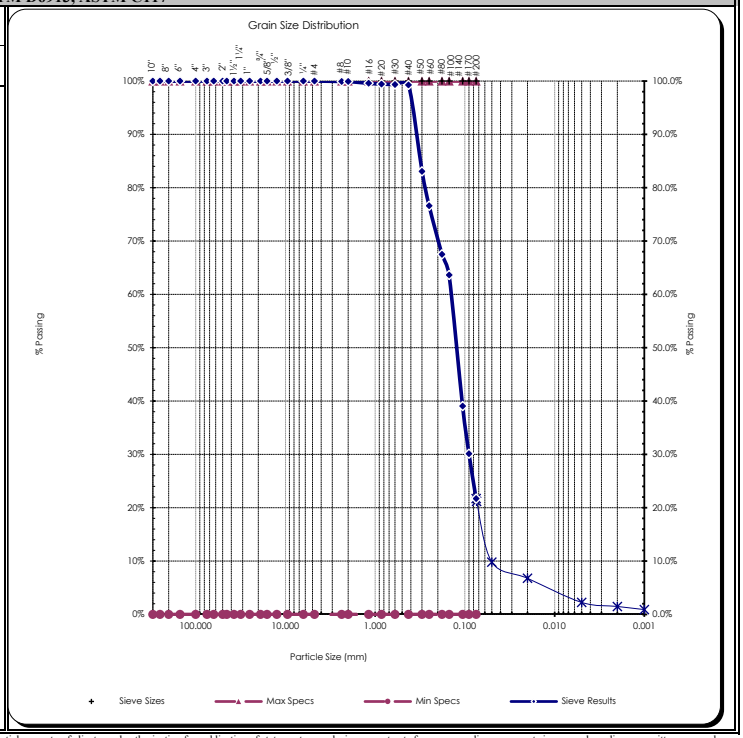
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.011	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.05
$D_{(10)}$ =	0.053	mm	% Sand =	78.3%	Coeff. of Uniformity, C_U = 2.69
$D_{(15)}$ =	0.063	mm	% Silt & Clay =	21.7%	Fineness Modulus = 0.54
$D_{(30)}$ =	0.090	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.126	mm	Plasticity Index =	n/a	Moisture %, as sampled = 32.1%
$D_{(60)}$ =	0.143	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.353	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	7/32		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		83%	100.0%	0.0%
#60	0.250		77%	100.0%	0.0%
#80	0.180		68%	100.0%	0.0%
#100	0.150	64%	64%	100.0%	0.0%
#140	0.106		39%	100.0%	0.0%
#170	0.090		30%	100.0%	0.0%
#200	0.075	21.7%	21.7%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	4-Oct-21
Source:	LDW21-GT23-GB-22.8-26.8 ft	**Tested By:**	K. Mendez
Sample#:	B21-1963		

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	76.06	grams
Hydroscopic Moist.:	1.08%	
Adj. Sample Wgt :	75.25	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	7.5	10.0%	0.0532 mm
2	6.5	8.6%	0.0378 mm
5	5.5	7.3%	0.0240 mm
15	4.5	6.0%	0.0139 mm
30	3.5	4.6%	0.0099 mm
60	2	2.7%	0.0070 mm
240	1.5	2.0%	0.0035 mm
1440	1	1.3%	0.0014 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	78.3%	**Plastic Limit:**	n/a
% Silt:	19.5%	**Plasticity Index:**	n/a
% Clay:	2.3%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	99%	0.850 mm
#40	99%	0.425 mm
#100	64%	0.150 mm
#200	21.7%	0.075 mm
Silts	21.2%	0.074 mm
	9.8%	0.050 mm
	6.8%	0.020 mm
Clays	2.3%	0.005 mm
	1.5%	0.002 mm
Colloids	0.9%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sand

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Client:	Anchor QEA	**Date:**	October 19, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-2050-2069
Revised on:		**Date sampled:**	8-4-21 & 8-5-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Date Received: July 29, 2021
Date Tested: October 8, 2021

Client: Anchor QEA
Sampled by: Client
Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-2050	LDW21-GT44-GB-0-5 ft	341.8	1294.0	1086.4	207.6	744.6	27.9%
B21-2051	LDW21-GT44-GB-5-6.1 ft	354.2	977.3	871.3	106.0	517.1	20.5%
B21-2052	LDW21-GT44-GB-6.1-6.5 ft	359.6	665.7	593.5	72.2	233.9	30.9%
B21-2053	LDW21-GT44-GB-5-10 ft	357.1	1289.6	1063.4	226.2	706.3	32.0%
B21-2054	LDW21-GT44-GB-10-11.5 ft	360.2	1379.9	1209.6	170.3	849.4	20.0%
B21-2055	LDW21-GT44-GB-10-15 ft	346.4	1230.1	1027.5	202.6	681.1	29.7%
B21-2056	LDW21-GT44-GB-15.5-16.5 ft	225.1	974.7	803.8	170.9	578.7	29.5%
B21-2057	LDW21-GT44-GB-15-20 ft	266.4	1004.4	805.9	198.5	539.5	36.8%
B21-2058	LDW21-GT44-GB-20-21.5 ft	301.2	1328.5	1051.3	277.2	750.1	37.0%
B21-2059	LDW21-GT44-GB-20-25 ft	224.4	1222.2	950.5	271.7	726.1	37.4%
B21-2060	LDW21-GT44-GB-25-28.7 ft	270.1	1116.1	1011.0	105.1	740.9	14.2%
B21-2061	LDW21-GT44-GB-28.7-30 ft	182.4	916.9	718.4	198.5	536.0	37.0%
B21-2062	LDW21-GT44-GB-30-31.5 ft	220.5	1200.8	943.4	257.4	722.9	35.6%
B21-2063	LDW21-GT48-GB-0-5 ft	234.7	1032.0	887.3	144.7	652.6	22.2%
B21-2064	LDW21-GT48-GB-5-6.5 ft	221.5	1216.7	1036.8	179.9	815.3	22.1%
B21-2065	LDW21-GT48-GB-5-10 ft	233.9	698.1	566.7	131.4	332.8	39.5%
B21-2066	LDW21-GT48-GB-10-15 ft	233.2	798.5	665.7	132.8	432.5	30.7%
B21-2067	LDW21-GT48-GB-15-18.2 ft	224.4	960.1	827.8	132.3	603.4	21.9%
B21-2068	LDW21-GT48-GB-18.2-19.5 ft	221.9	948.5	777.2	171.3	555.3	30.8%
B21-2069	LDW21-GT48-GB-20-21.6 ft	306.7	947.8	795.3	152.5	488.6	31.2%

Reviewed by: Meghan Blodgett-Carrillo

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: September 20, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-2055	LDW21-GT44-GB-10-15 ft	497.91	595.93	98.0	TSA-017	187.9	499.4	0.99858	747.34	686.58	18.1	2.630647	1.00037	2.6316204
B21-2066	LDW21-GT48-GB-10-15 ft	510.08	607.93	97.9	TSA-011	190.3	499.5	0.99856	749.61	689.15	18.2	2.6169635	1.00035	2.6178795

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT44-GB-0-5 ft
Sample#: B21-2050

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SW-SC, Well-graded Sand with Silty Clay
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

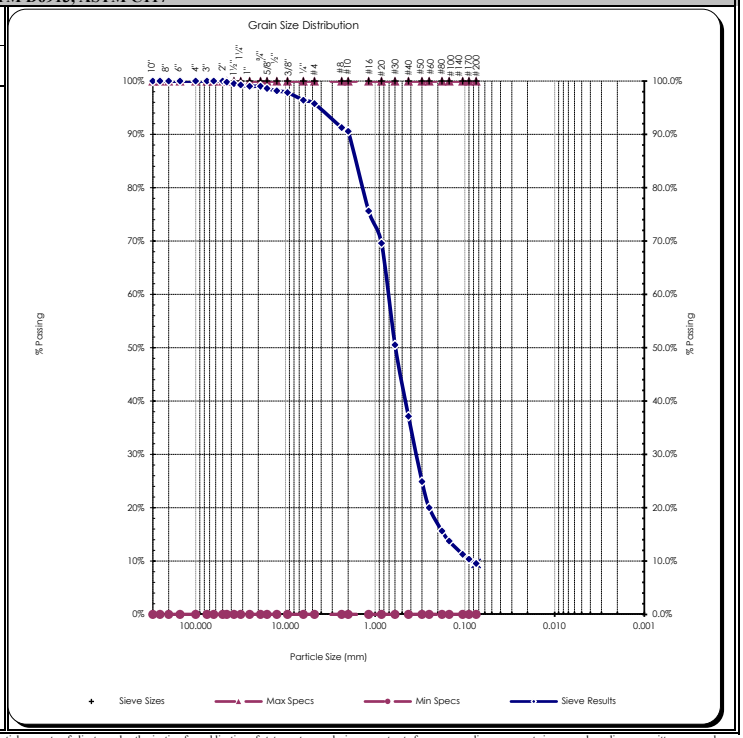
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.039	mm	% Gravel =	4.2%	Coeff. of Curvature, C_C = 2.07
$D_{(10)}$ =	0.083	mm	% Sand =	86.2%	Coeff. of Uniformity, C_U = 8.74
$D_{(15)}$ =	0.170	mm	% Silt & Clay =	9.6%	Fineness Modulus = 2.51
$D_{(30)}$ =	0.352	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.593	mm	Plasticity Index =	n/a	Moisture %, as sampled = 27.9%
$D_{(60)}$ =	0.724	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.967	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	9/35		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		99%	100.0%	0.0%
1.00"	25.00	99%	99%	100.0%	0.0%
3/4"	19.00	99%	99%	100.0%	0.0%
5/8"	16.00		99%	100.0%	0.0%
1/2"	12.50	98%	98%	100.0%	0.0%
3/8"	9.50	98%	98%	100.0%	0.0%
1/4"	6.30		96%	100.0%	0.0%
#4	4.75	96%	96%	100.0%	0.0%
#8	2.36		91%	100.0%	0.0%
#10	2.00	91%	91%	100.0%	0.0%
#16	1.18		76%	100.0%	0.0%
#20	0.850	70%	70%	100.0%	0.0%
#30	0.600		51%	100.0%	0.0%
#40	0.425	37%	37%	100.0%	0.0%
#50	0.300		25%	100.0%	0.0%
#60	0.250	20%	20%	100.0%	0.0%
#80	0.180		16%	100.0%	0.0%
#100	0.150	14%	14%	100.0%	0.0%
#140	0.106		11%	100.0%	0.0%
#170	0.090		10%	100.0%	0.0%
#200	0.075	9.6%	9.6%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

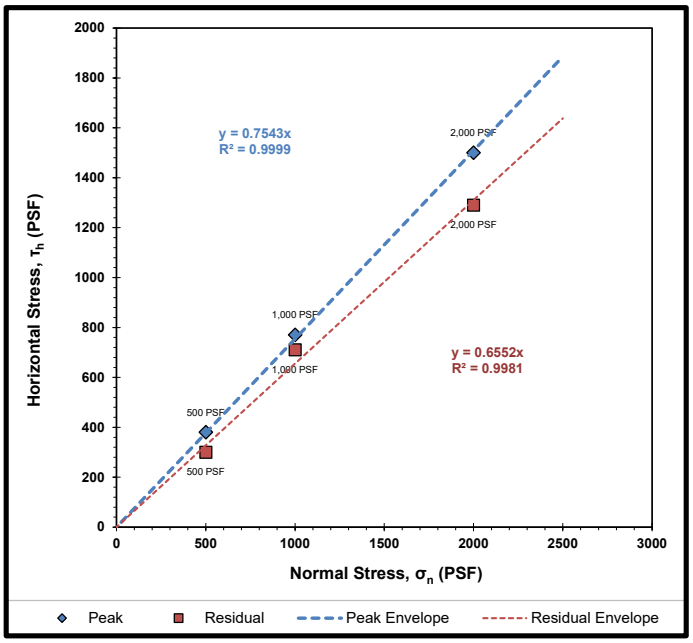
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT44-GB-0-5 ft
Laboratory Sample ID:	B21-2050	**Visual Soil Description:**	brown silty sand with gravel
Sample Date:	8/4/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	10/13/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	24.6	
	Initial	**Post-Consolidation**
Dry Density (PCF):	109.7	110.8
Void Ratio:	0.536	0.520
Porosity (%):	34.9	34.2
Degree of Saturation (%):	saturated	saturated

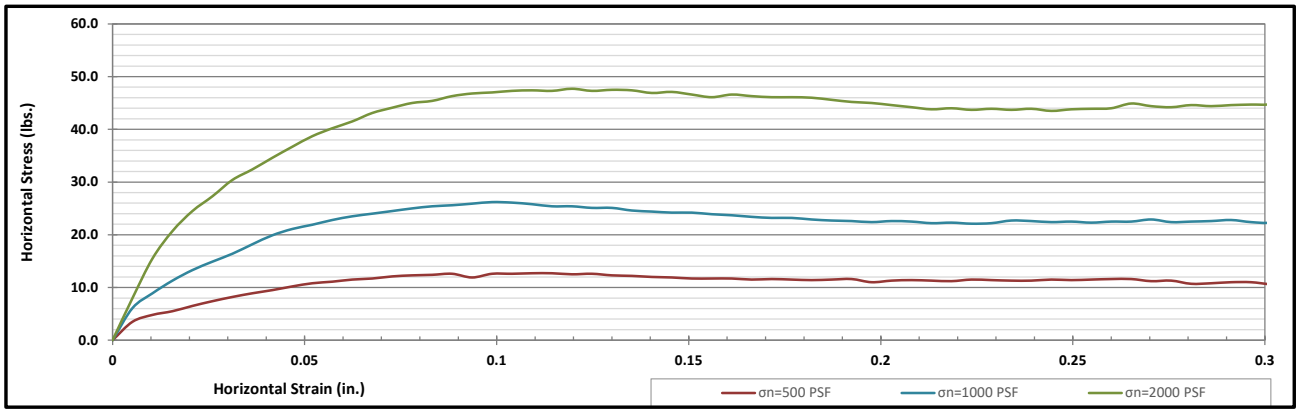
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	23.8	
	Initial	**Post-Consolidation**
Dry Density (PCF):	110.7	113.4
Void Ratio:	0.523	0.486
Porosity (%):	34.3	32.7
Degree of Saturation (%):	saturated	saturated

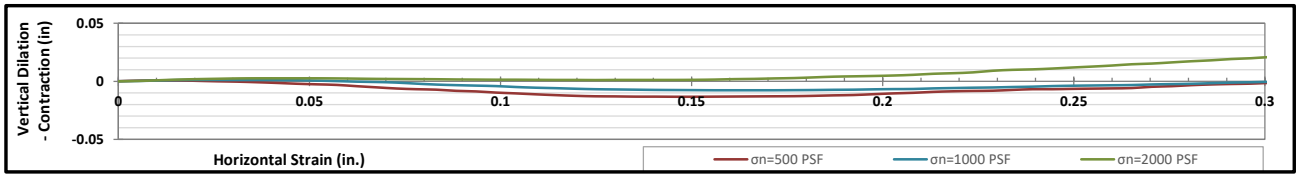
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	23.8	
	Initial	**Post-Consolidation**
Dry Density (PCF):	110.9	114.3
Void Ratio:	0.520	0.473
Porosity (%):	34.2	32.1
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**37**	**33**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	380	770	1500
Residual Horizontal Stress, τ_h (PSF):	300	710	1290





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NW Region • 805 Dupont, Suite #5 • Bellingham, WA 98225 • Phone 360.647.6061 • Fax 360.647.8111
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Visit our website: www.mtc-inc.net

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT44-GB-5-10 ft
Sample#: B21-2053

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
dark brown

ACCREDITED
Certificate #: 1366.01

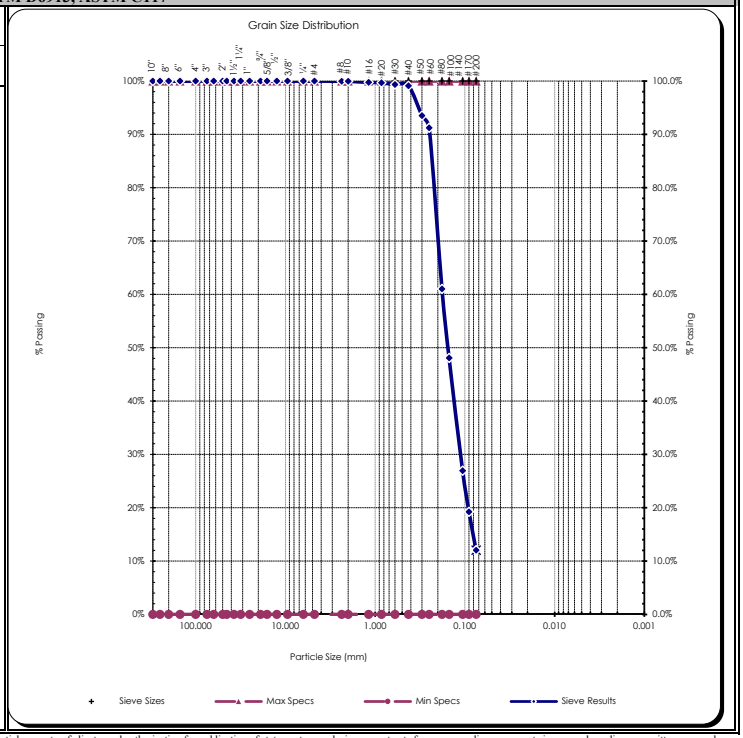
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.031	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.14
$D_{(10)}$ =	0.062	mm	% Sand =	88.0%	Coeff. of Uniformity, C_U = 2.85
$D_{(15)}$ =	0.081	mm	% Silt & Clay =	12.0%	Fineness Modulus = 0.59
$D_{(30)}$ =	0.112	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.154	mm	Plasticity Index =	n/a	Moisture %, as sampled = 32.0%
$D_{(60)}$ =	0.178	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.247	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	9/74		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850	100%	100%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		93%	100.0%	0.0%
#60	0.250	91%	91%	100.0%	0.0%
#80	0.180		61%	100.0%	0.0%
#100	0.150	48%	48%	100.0%	0.0%
#140	0.106		27%	100.0%	0.0%
#170	0.090		19%	100.0%	0.0%
#200	0.075	12.0%	12.0%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT44-GB-10-15 ft
Sample#: B21-2055

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
dark brown

ACCREDITED
Certificate #: 1366.01

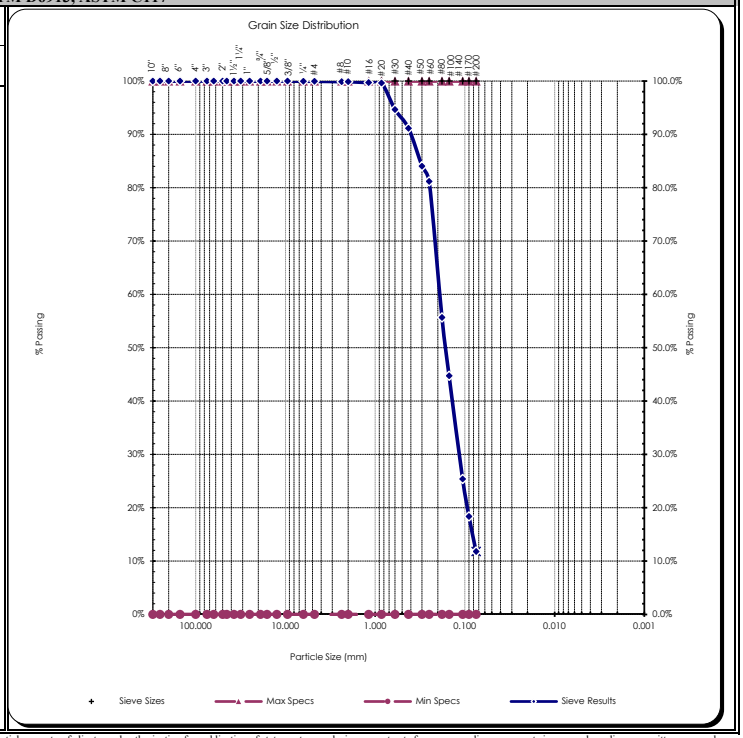
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.032	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.11
$D_{(10)}$ =	0.064	mm	% Sand =	88.2%	Coeff. of Uniformity, C_U = 3.02
$D_{(15)}$ =	0.082	mm	% Silt & Clay =	11.8%	Fineness Modulus = 0.77
$D_{(30)}$ =	0.116	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.164	mm	Plasticity Index =	n/a	Moisture %, as sampled = 29.7%
$D_{(60)}$ =	0.192	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.404	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	11/85		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850	100%	100%	100.0%	0.0%
#30	0.600		95%	100.0%	0.0%
#40	0.425	91%	91%	100.0%	0.0%
#50	0.300		84%	100.0%	0.0%
#60	0.250	81%	81%	100.0%	0.0%
#80	0.180		56%	100.0%	0.0%
#100	0.150	45%	45%	100.0%	0.0%
#140	0.106		25%	100.0%	0.0%
#170	0.090		18%	100.0%	0.0%
#200	0.075	11.8%	11.8%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT44-GB-15-20 ft
Sample#: B21-2057

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Visual Identification
Sandy Silt
Sample Color:
dark brown

ACCREDITED
Certificate #: 1366.01

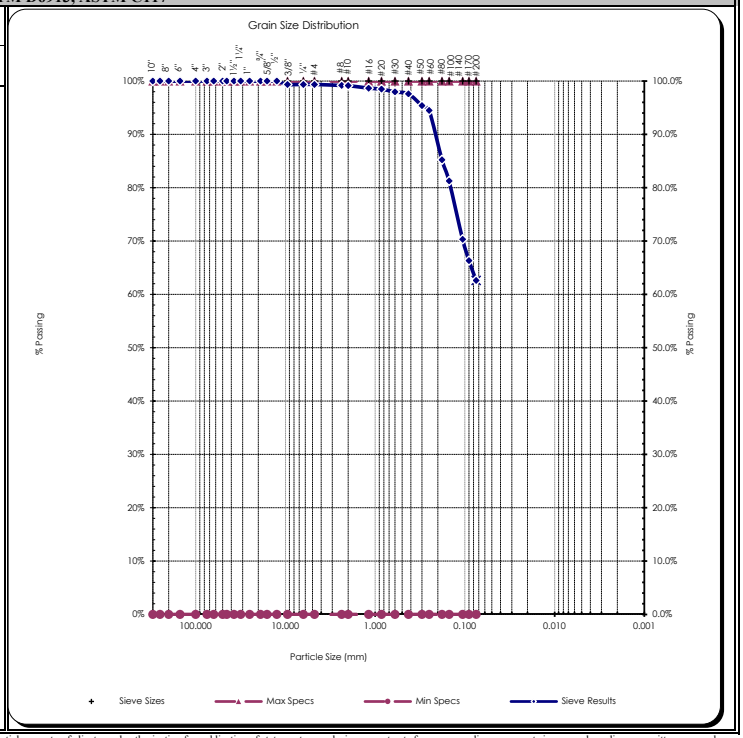
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.006	mm	% Gravel =	0.6%	Coeff. of Curvature, C_C = 1.50
$D_{(10)}$ =	0.012	mm	% Sand =	36.7%	Coeff. of Uniformity, C_U = 6.00
$D_{(15)}$ =	0.018	mm	% Silt & Clay =	62.6%	Fineness Modulus = 0.29
$D_{(30)}$ =	0.036	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.060	mm	Plasticity Index =	n/a	Moisture %, as sampled = 36.8%
$D_{(60)}$ =	0.072	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.216	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	43/67		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	99%	99%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850	98%	98%	100.0%	0.0%
#30	0.600		98%	100.0%	0.0%
#40	0.425	98%	98%	100.0%	0.0%
#50	0.300		95%	100.0%	0.0%
#60	0.250	94%	94%	100.0%	0.0%
#80	0.180		85%	100.0%	0.0%
#100	0.150	81%	81%	100.0%	0.0%
#140	0.106		70%	100.0%	0.0%
#170	0.090		66%	100.0%	0.0%
#200	0.075	62.6%	62.6%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT44-GB-20-25 ft
Sample#: B21-2059

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Visual Identification
Sandy Silt with Clay
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

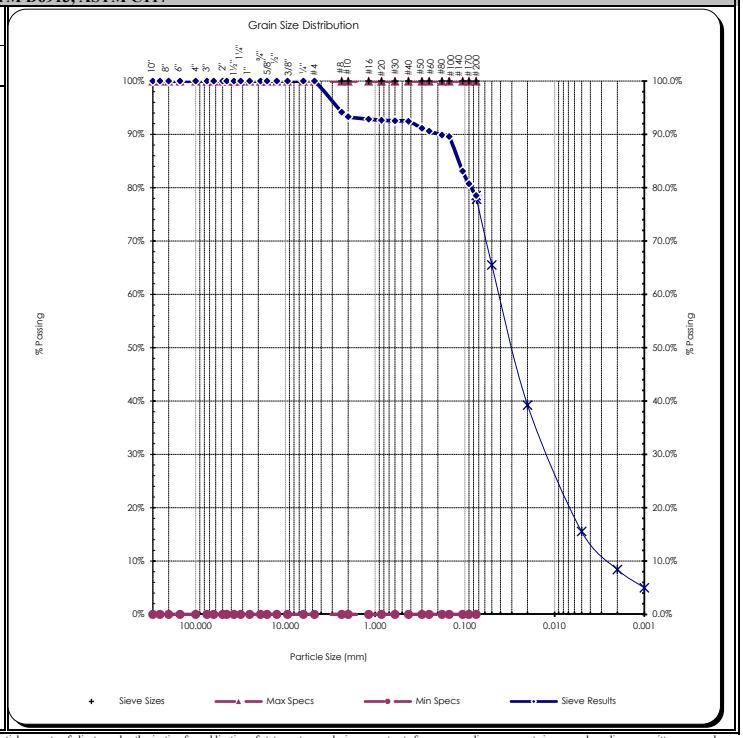
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.001	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.61
$D_{(10)}$ =	0.003	mm	% Sand =	21.5%	Coeff. of Uniformity, C_U = 17.87
$D_{(15)}$ =	0.005	mm	% Silt & Clay =	78.5%	Fineness Modulus = 0.40
$D_{(30)}$ =	0.014	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.032	mm	Plasticity Index =	n/a	Moisture %, as sampled = 37.4%
$D_{(60)}$ =	0.048	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.190	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	17/20		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		94%	100.0%	0.0%
#10	2.00	93%	93%	100.0%	0.0%
#16	1.18		93%	100.0%	0.0%
#20	0.850		93%	100.0%	0.0%
#30	0.600		93%	100.0%	0.0%
#40	0.425	92%	92%	100.0%	0.0%
#50	0.300		91%	100.0%	0.0%
#60	0.250		91%	100.0%	0.0%
#80	0.180		90%	100.0%	0.0%
#100	0.150	90%	90%	100.0%	0.0%
#140	0.106		83%	100.0%	0.0%
#170	0.090		81%	100.0%	0.0%
#200	0.075	78.5%	78.5%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	8-Oct-21
Source:	LDW21-GT44-GB-20-25 ft	**Tested By:**	A. Eifrig
Sample#:	B21-2059		

Visual Identification
Sandy Silt with Clay
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	75.15	grams
Hydroscopic Moist.:	3.83%	
Adj. Sample Wgt :	72.38	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	43	55.4%	0.0414 mm
2	38	49.0%	0.0307 mm
5	31	40.0%	0.0204 mm
15	21	27.1%	0.0127 mm
30	18	23.2%	0.0091 mm
60	15	19.3%	0.0065 mm
240	9	11.6%	0.0034 mm
1440	5.5	7.1%	0.0014 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	21.5%	**Plastic Limit:**	n/a
% Silt:	63.0%	**Plasticity Index:**	n/a
% Clay:	15.5%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	93%	2.000 mm
#20	93%	0.850 mm
#40	92%	0.425 mm
#100	90%	0.150 mm
#200	78.5%	0.075 mm
Silts	77.8%	0.074 mm
	65.5%	0.050 mm
	39.3%	0.020 mm
Clays	15.5%	0.005 mm
	8.4%	0.002 mm
Colloids	5.0%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Silt Loam

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT44-GB-25-28.7 ft
Sample#: B21-2060

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SP, Poorly graded Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

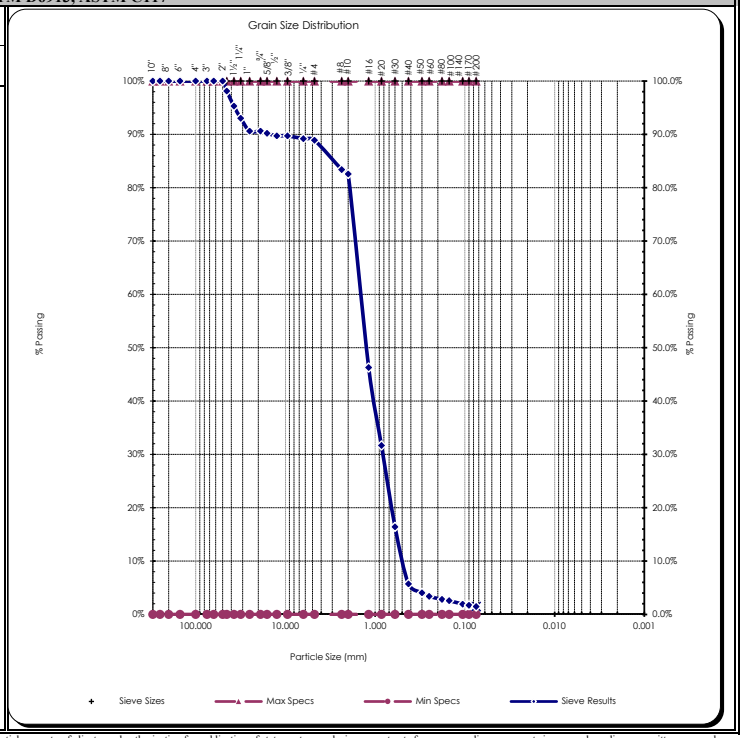
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.370	mm	% Gravel =	11.1%	Coeff. of Curvature, C_C = 0.92
$D_{(10)}$ =	0.495	mm	% Sand =	87.4%	Coeff. of Uniformity, C_U = 3.01
$D_{(15)}$ =	0.577	mm	% Silt & Clay =	1.5%	Fineness Modulus = 3.78
$D_{(30)}$ =	0.822	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	1.264	mm	Plasticity Index =	n/a	Moisture %, as sampled = 14.2%
$D_{(60)}$ =	1.490	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	14.510	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	6/23		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		98%	100.0%	0.0%
1.50"	37.50		95%	100.0%	0.0%
1.25"	31.50		93%	100.0%	0.0%
1.00"	25.00	91%	91%	100.0%	0.0%
3/4"	19.00	91%	91%	100.0%	0.0%
5/8"	16.00		90%	100.0%	0.0%
1/2"	12.50	90%	90%	100.0%	0.0%
3/8"	9.50	90%	90%	100.0%	0.0%
1/4"	6.30		89%	100.0%	0.0%
#4	4.75	89%	89%	100.0%	0.0%
#8	2.36		83%	100.0%	0.0%
#10	2.00	83%	83%	100.0%	0.0%
#16	1.18		46%	100.0%	0.0%
#20	0.850	32%	32%	100.0%	0.0%
#30	0.600		16%	100.0%	0.0%
#40	0.425	6%	6%	100.0%	0.0%
#50	0.300		4%	100.0%	0.0%
#60	0.250	3%	3%	100.0%	0.0%
#80	0.180		3%	100.0%	0.0%
#100	0.150	3%	3%	100.0%	0.0%
#140	0.106		2%	100.0%	0.0%
#170	0.090		2%	100.0%	0.0%
#200	0.075	1.5%	1.5%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT44-GB-28.7-30 ft
Sample#: B21-2061

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Visual Identification
Sandy Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

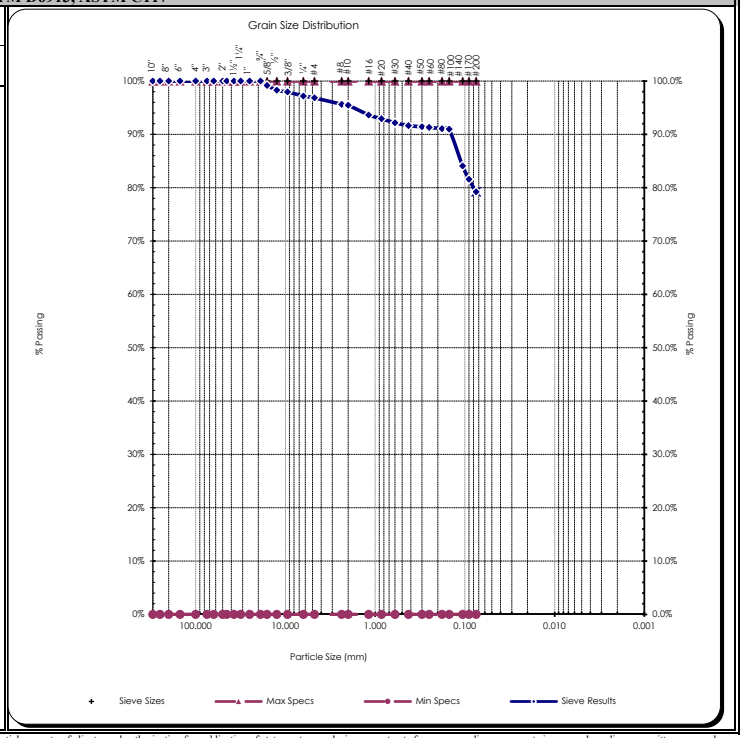
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.005	mm	% Gravel =	3.2%	Coeff. of Curvature, C_C =	1.50
$D_{(10)}$ =	0.009	mm	% Sand =	17.6%	Coeff. of Uniformity, C_U =	6.00
$D_{(15)}$ =	0.014	mm	% Silt & Clay =	79.2%	Fineness Modulus =	0.41
$D_{(30)}$ =	0.028	mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.047	mm	Plasticity Index =	n/a	Moisture %, as sampled =	37.0%
$D_{(60)}$ =	0.057	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	0.144	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	51/59		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		99%	100.0%	0.0%
1/2"	12.50	98%	98%	100.0%	0.0%
3/8"	9.50	98%	98%	100.0%	0.0%
1/4"	6.30		97%	100.0%	0.0%
#4	4.75	97%	97%	100.0%	0.0%
#8	2.36		96%	100.0%	0.0%
#10	2.00	95%	95%	100.0%	0.0%
#16	1.18		94%	100.0%	0.0%
#20	0.850	93%	93%	100.0%	0.0%
#30	0.600		92%	100.0%	0.0%
#40	0.425	92%	92%	100.0%	0.0%
#50	0.300		91%	100.0%	0.0%
#60	0.250	91%	91%	100.0%	0.0%
#80	0.180		91%	100.0%	0.0%
#100	0.150	91%	91%	100.0%	0.0%
#140	0.106		84%	100.0%	0.0%
#170	0.090		82%	100.0%	0.0%
#200	0.075	79.2%	79.2%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

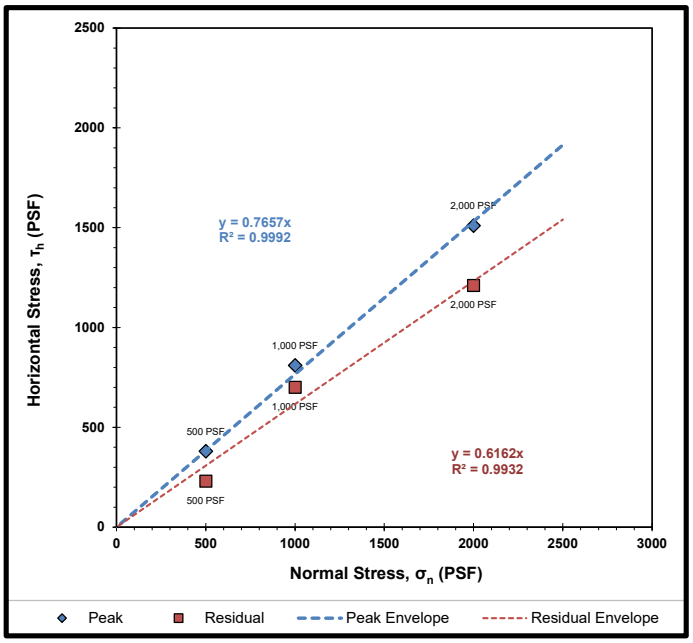
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT48-GB-5-10 ft
Laboratory Sample ID:	B21-2065	**Visual Soil Description:**	brown silty sand with gravel
Sample Date:	8/5/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	10/15/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	37.5	
	Initial	**Post-Consolidation**
Dry Density (PCF):	-4530.4	-4603.6
Void Ratio:	-1.037	-1.037
Porosity (%):	2789.0	2832.4
Degree of Saturation (%):	-97.6	saturated

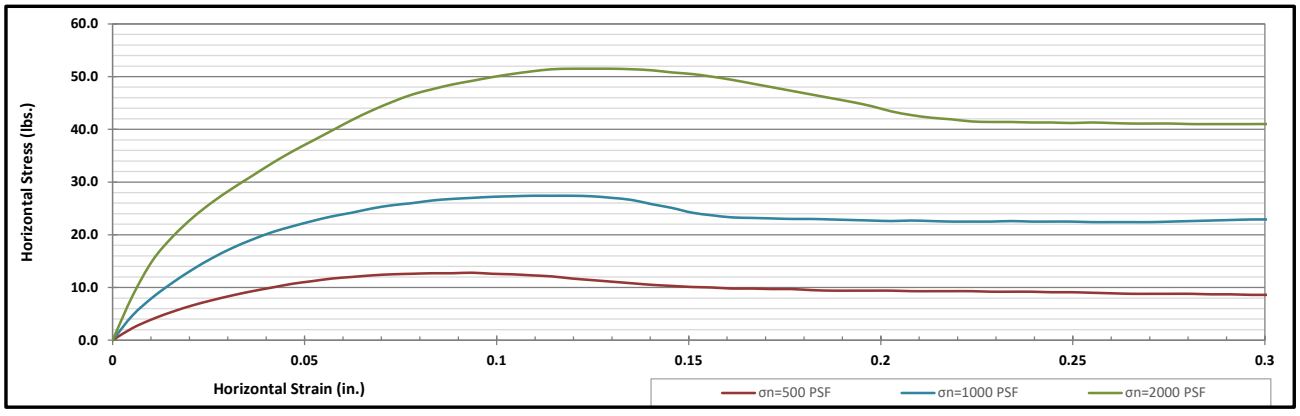
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	34.3	
	Initial	**Post-Consolidation**
Dry Density (PCF):	100.8	104.7
Void Ratio:	0.672	0.610
Porosity (%):	40.2	37.9
Degree of Saturation (%):	saturated	saturated

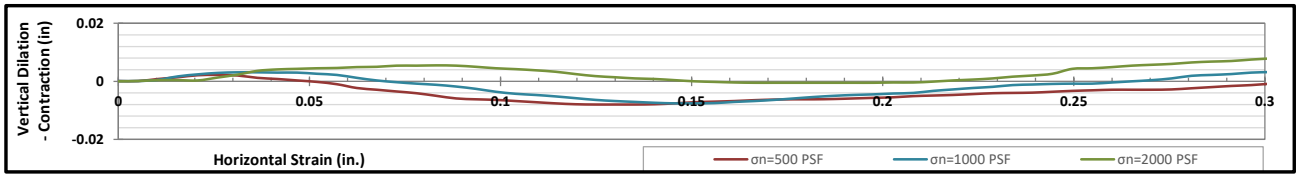
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	35.3	
	Initial	**Post-Consolidation**
Dry Density (PCF):	100.6	106.4
Void Ratio:	0.675	0.584
Porosity (%):	40.3	36.9
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**37**	**32**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	380	810	1510
Residual Horizontal Stress, τ_h (PSF):	230	700	1210





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NW Region • 805 Dupont, Suite #5 • Bellingham, WA 98225 • Phone 360.647.6061 • Fax 360.647.8111
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Visit our website: www.mtc-inc.net

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT48-GB-0-5 ft
Sample#: B21-2063

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SP, Poorly graded Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

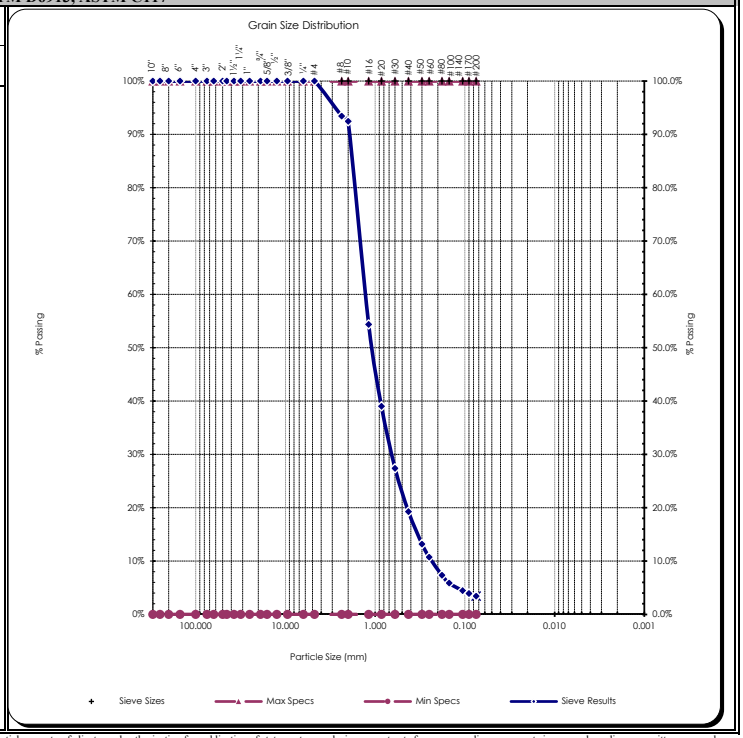
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.123	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.41
$D_{(10)}$ =	0.234	mm	% Sand =	96.5%	Coeff. of Uniformity, C_U = 5.55
$D_{(15)}$ =	0.337	mm	% Silt & Clay =	3.5%	Fineness Modulus = 3.06
$D_{(30)}$ =	0.655	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	1.086	mm	Plasticity Index =	n/a	Moisture %, as sampled = 22.2%
$D_{(60)}$ =	1.301	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.947	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	7/39		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		93%	100.0%	0.0%
#10	2.00	92%	92%	100.0%	0.0%
#16	1.18		54%	100.0%	0.0%
#20	0.850		39%	100.0%	0.0%
#30	0.600		27%	100.0%	0.0%
#40	0.425	19%	19%	100.0%	0.0%
#50	0.300		13%	100.0%	0.0%
#60	0.250		11%	100.0%	0.0%
#80	0.180		7%	100.0%	0.0%
#100	0.150	6%	6%	100.0%	0.0%
#140	0.106		4%	100.0%	0.0%
#170	0.090		4%	100.0%	0.0%
#200	0.075	3.5%	3.5%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT48-GB-5-10 ft
Sample#: B21-2065

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

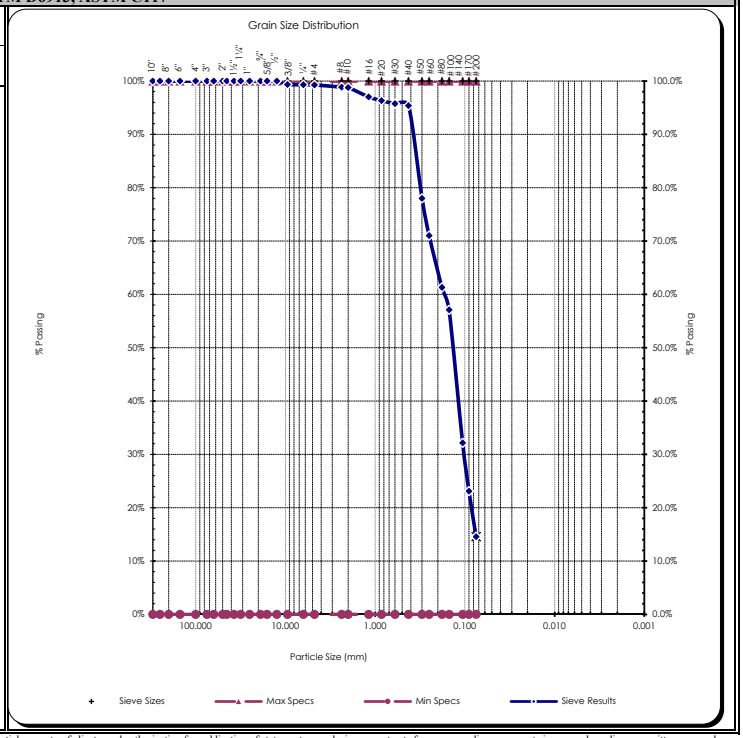
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.026	mm	% Gravel =	0.7%	Coeff. of Curvature, C_C = 1.19
$D_{(10)}$ =	0.051	mm	% Sand =	84.7%	Coeff. of Uniformity, C_U = 3.32
$D_{(15)}$ =	0.076	mm	% Silt & Clay =	14.6%	Fineness Modulus = 0.75
$D_{(30)}$ =	0.102	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.137	mm	Plasticity Index =	n/a	Moisture %, as sampled = 39.5%
$D_{(60)}$ =	0.171	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.386	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	15/98		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	99%	99%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		97%	100.0%	0.0%
#20	0.850		96%	100.0%	0.0%
#30	0.600		96%	100.0%	0.0%
#40	0.425	95%	95%	100.0%	0.0%
#50	0.300		78%	100.0%	0.0%
#60	0.250		71%	100.0%	0.0%
#80	0.180		61%	100.0%	0.0%
#100	0.150	57%	57%	100.0%	0.0%
#140	0.106		32%	100.0%	0.0%
#170	0.090		23%	100.0%	0.0%
#200	0.075	14.6%	14.6%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT48-GB-10-15 ft
Sample#: B21-2066

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color:
dark brown

ACCREDITED
Certificate #: 1366.01

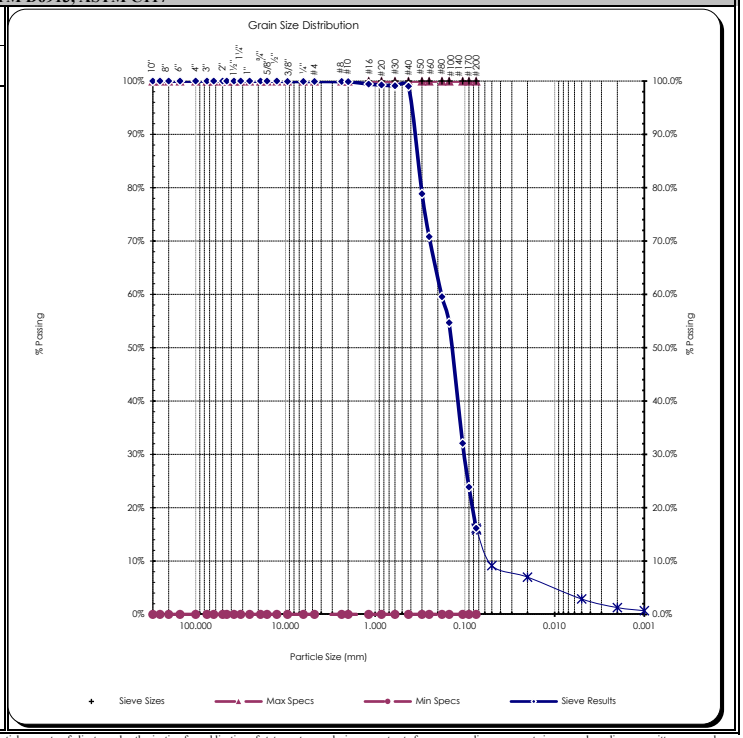
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.009	mm	% Gravel =	0.1%	Coeff. of Curvature, C_C = 1.02
$D_{(10)}$ =	0.056	mm	% Sand =	83.7%	Coeff. of Uniformity, C_U = 3.29
$D_{(15)}$ =	0.071	mm	% Silt & Clay =	16.2%	Fineness Modulus = 0.68
$D_{(30)}$ =	0.102	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.141	mm	Plasticity Index =	n/a	Moisture %, as sampled = 30.7%
$D_{(60)}$ =	0.183	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.369	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	8/49		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		79%	100.0%	0.0%
#60	0.250		71%	100.0%	0.0%
#80	0.180		60%	100.0%	0.0%
#100	0.150	55%	55%	100.0%	0.0%
#140	0.106		32%	100.0%	0.0%
#170	0.090		24%	100.0%	0.0%
#200	0.075	16.2%	16.2%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	8-Oct-21
Source:	LDW21-GT48-GB-10-15 ft	**Tested By:**	A. Eifrig
Sample#:	B21-2066		

Unified Soils Classification System, ASTM D-2487
SM, Silty Sand
Sample Color
dark brown

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr :	2.62	
Sample Weight:	100.83	grams
Hydroscopic Moist.:	3.02%	
Adj. Sample Wgt :	97.87	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	9	9.3%	0.0533 mm
2	8	8.2%	0.0380 mm
5	7	7.2%	0.0242 mm
15	6.5	6.7%	0.0140 mm
30	5.5	5.7%	0.0100 mm
60	4	4.1%	0.0071 mm
240	2	2.1%	0.0036 mm
1440	1	1.0%	0.0015 mm

% Gravel:	0.1%	**Liquid Limit:**	n/a
% Sand:	83.7%	**Plastic Limit:**	n/a
% Silt:	13.3%	**Plasticity Index:**	n/a
% Clay:	2.9%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	99%	0.850 mm
#40	99%	0.425 mm
#100	55%	0.150 mm
#200	16.2%	0.075 mm
Silts	15.9%	0.074 mm
	9.1%	0.050 mm
	7.0%	0.020 mm
Clays	2.9%	0.005 mm
	1.3%	0.002 mm
Colloids	0.7%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sand

Comments:

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT48-GB-15-18.2 ft
Sample#: B21-2067

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
dark brown

ACCREDITED
Certificate #: 1366.01

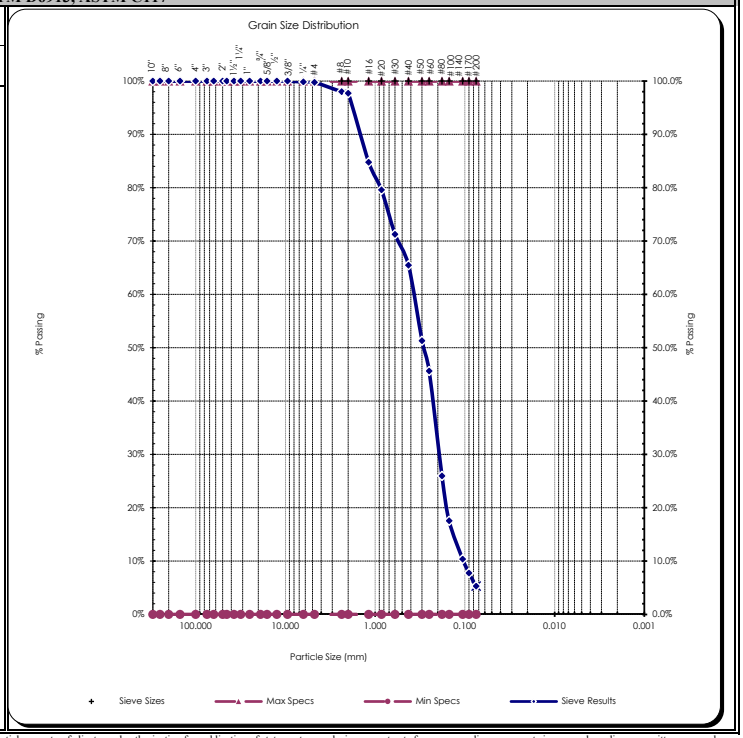
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.070	mm	% Gravel =	0.2%	Coeff. of Curvature, C_C =	0.97
$D_{(10)}$ =	0.104	mm	% Sand =	94.4%	Coeff. of Uniformity, C_U =	3.64
$D_{(15)}$ =	0.134	mm	% Silt & Clay =	5.3%	Fineness Modulus =	1.77
$D_{(30)}$ =	0.194	mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.288	mm	Plasticity Index =	n/a	Moisture %, as sampled =	21.9%
$D_{(60)}$ =	0.377	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	1.510	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	4/49		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	98%	98%	100.0%	0.0%
#16	1.18		85%	100.0%	0.0%
#20	0.850	80%	80%	100.0%	0.0%
#30	0.600		71%	100.0%	0.0%
#40	0.425	65%	65%	100.0%	0.0%
#50	0.300		51%	100.0%	0.0%
#60	0.250	46%	46%	100.0%	0.0%
#80	0.180		26%	100.0%	0.0%
#100	0.150	18%	18%	100.0%	0.0%
#140	0.106		10%	100.0%	0.0%
#170	0.090		8%	100.0%	0.0%
#200	0.075	5.3%	5.3%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT48-GB-18.2-19.5 ft
Sample#: B21-2068

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Visual Identification
Sandy Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

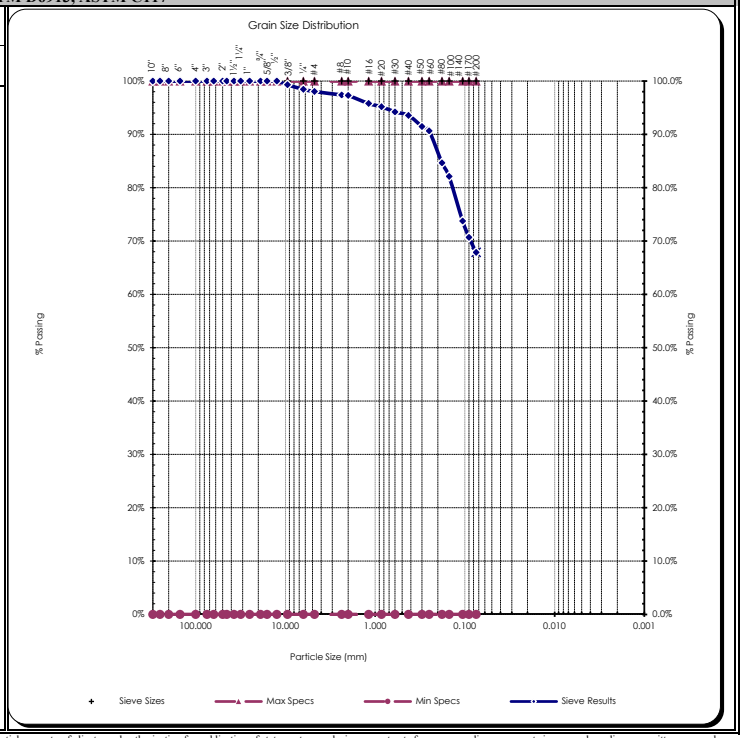
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.006	mm	% Gravel =	2.0%	Coeff. of Curvature, C_C = 1.50
$D_{(10)}$ =	0.011	mm	% Sand =	30.2%	Coeff. of Uniformity, C_U = 6.00
$D_{(15)}$ =	0.017	mm	% Silt & Clay =	67.9%	Fineness Modulus = 0.42
$D_{(30)}$ =	0.033	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.055	mm	Plasticity Index =	n/a	Moisture %, as sampled = 30.8%
$D_{(60)}$ =	0.066	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.242	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	37/51		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	99%	99%	100.0%	0.0%
1/4"	6.30		98%	100.0%	0.0%
#4	4.75	98%	98%	100.0%	0.0%
#8	2.36		97%	100.0%	0.0%
#10	2.00	97%	97%	100.0%	0.0%
#16	1.18		96%	100.0%	0.0%
#20	0.850	95%	95%	100.0%	0.0%
#30	0.600		94%	100.0%	0.0%
#40	0.425	94%	94%	100.0%	0.0%
#50	0.300		91%	100.0%	0.0%
#60	0.250	91%	91%	100.0%	0.0%
#80	0.180		85%	100.0%	0.0%
#100	0.150	82%	82%	100.0%	0.0%
#140	0.106		74%	100.0%	0.0%
#170	0.090		71%	100.0%	0.0%
#200	0.075	67.9%	67.9%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT48-GB-20-21.6 ft
Sample#: B21-2069

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 8-Oct-21
Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
dark brown

ACCREDITED
Certificate #: 1366.01

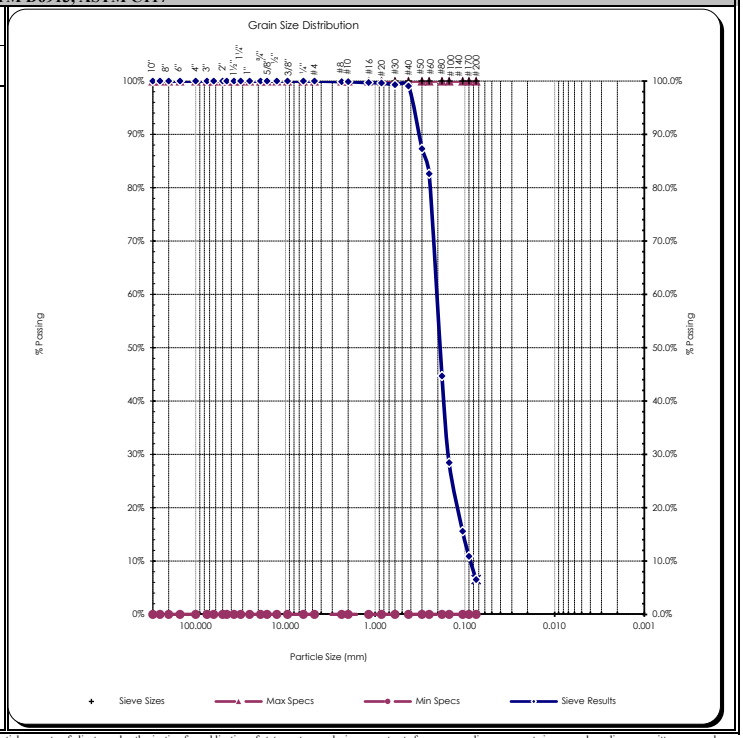
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.057	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C =	1.29
$D_{(10)}$ =	0.087	mm	% Sand =	93.5%	Coeff. of Uniformity, C_U =	2.40
$D_{(15)}$ =	0.104	mm	% Silt & Clay =	6.5%	Fineness Modulus =	0.85
$D_{(30)}$ =	0.153	mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.190	mm	Plasticity Index =	n/a	Moisture %, as sampled =	31.2%
$D_{(60)}$ =	0.208	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	0.329	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	6/91		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850	100%	100%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		87%	100.0%	0.0%
#60	0.250	83%	83%	100.0%	0.0%
#80	0.180		45%	100.0%	0.0%
#100	0.150	28%	28%	100.0%	0.0%
#140	0.106		16%	100.0%	0.0%
#170	0.090		11%	100.0%	0.0%
#200	0.075	6.5%	6.5%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

HWA GeoSciences Inc.
DBE/MWBE

October 19, 2021
HWA Project No. 2012-002-23 Task 51

Materials Testing & Consulting, Inc.
777 Chrysler Drive
Burlington, WA 98233

Attention: Ms. Meghan Blodgett-Carrillo

Subject: **LABORATORY TESTING REPORT**
QC - Lower Duwamish Waterway
MTC Project Number: 21B233

Dear Ms. Blodgett-Carrillo;

In accordance with your request, HWA GeoSciences Inc. (HWA) performed laboratory testing for the above referenced project. Herein we present the results of our laboratory analyses, which are summarized on the attached Figures. The laboratory testing program was performed in general accordance with your instructions and appropriate ASTM Standards as outlined below.

SAMPLE DESCRIPTION: The subject samples were delivered to our laboratory on August 26, 2021 by MTC personnel. The samples were delivered in four Shelby tubes and were designated with exploration ID and depth of sampling. The soil samples were classified using visual-manual methods. The descriptions may be found on the attached Summary of Material Properties, Figure 1.

MOISTURE CONTENT OF SOIL: The moisture contents of the soil samples (percent by dry mass) were determined in general accordance with ASTM D2216. The results are shown on Figure 1.

SPECIFIC GRAVITY OF SOILS: The specific gravity of the selected samples was determined using method ASTM D854. The test results are shown on the attached Summary of Material Properties, Figure 1.

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ATTERBERG LIMITS): The plasticity index of each specified sample was tested using method ASTM D4318, multi-point method. The results are reported on the attached Liquid Limit, Plastic Limit, and Plasticity Index of Soils Report, Figure 2.

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION OF SOILS: Selected samples were tested in general accordance with method ASTM D4767 to determine the shear strength characteristics of the soil. The samples were extruded from Shelby tubes, and the test specimens were trimmed to obtain a cylindrical test sample with a length to diameter ratio between 2:1 and 2.5:1. The specimens were carefully weighed and measured prior to testing.

Three trials were run at varying confining stresses specified by the client. Each sample was run using a single specimen to perform a multi-stage shear test.

The multi-stage method was performed by first consolidating the sample at the lowest specified confining pressure. The sample was then sheared until the change in pore pressure was at or near its estimated peak. After reaching the peak change in pore pressure, the shear phase was terminated, and the specimen was reconsolidated at the middle consolidation pressure. Under the second consolidation pressure the sample was again sheared until the change in pore pressure was at or near its estimated peak, at which point the shear was terminated. The sample was reconsolidated a third and final time under the highest confining pressure and shearing was performed to sample failure, concluding the test.

For sample LDW21-GT33-GB at 6.0-8.0', the test was terminated at 20.5% strain due to a spike in pore pressure caused by a perforation in the membrane encasing the sample. As a result, the final moisture content of the sample was affected due to the ingress of water from the surrounding water filled pressure cell. The final moisture content for this sample was determined to be 70.7%.

The Consolidated Undrained test results are summarized and plotted graphically in Figures 3-6.

ONE DIMENSIONAL CONSOLIDATION PROPERTIES OF SOIL: The consolidation properties of selected soil samples were measured in general accordance with ASTM D 2435. Saturation was maintained by inundation of the sample throughout the test. The samples were subjected to increasing increments of total stress, the duration of which was selected to exceed the time required for completion of primary consolidation as defined in the Standard, Method B. Unloading of the sample was carried out incrementally. The primary compression test results are presented on the attached Consolidation Test Reports, Figures 7-10.

CLOSURE: Experience has shown that test values on soil and other natural materials vary with each representative sample. As such, HWA has no knowledge as to the extent and quantity of material the tested samples may represent. HWA also makes no warranty as to how representative either the samples tested or the test results obtained are to actual field conditions. It is a well-established fact that sampling methods present varying degrees of disturbance that affect sample representativeness.

No copy should be made of this report except in its entirety.

We appreciate the opportunity to provide laboratory testing services on this project. Should you have any questions or comments, or if we may be of further service, please call.

Sincerely,

HWA GEOSCIENCES INC.

Greg Barker
Materials Laboratory Supervisor

Steven E. Greene, L.G., L.E.G.
Principal Engineering Geologist
Vice President

Attachments:

Figure 1	Summary of Material Properties
Figure 2	Liquid Limit, Plastic Limit and Plasticity Index of Soils
Figures 3-6	Consolidated Undrained Triaxial Compression Test for Cohesive Soils
Figures 7-10	Consolidation Test Report

EXPLORATION DESIGNATION	TOP DEPTH (feet)	BOTTOM DEPTH (feet)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)	SPECIFIC GRAVITY	ATTERBERG LIMITS (%)			% GRAVEL	% SAND	% FINES	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
						LL	PL	PI					
LDW21-GT23-GB,	28.5	30.5	33.3		2.617	26	25	1				SM	Dark grayish-brown, silty SAND
LDW21-GT33-GB,	6.0	8.0	58.6		2.612	38	36	2				ML	Very dark grayish-brown, SILT with sand
LDW21-GT33-GB,	21.0	23.0	35.3		2.643	31	29	2				SM	Very dark grayish-brown, silty SAND
LDW21-GT53-SPT,	30.0	32.0	43.6		2.627	38	27	11				ML	Very dark grayish-brown, SILT with sand

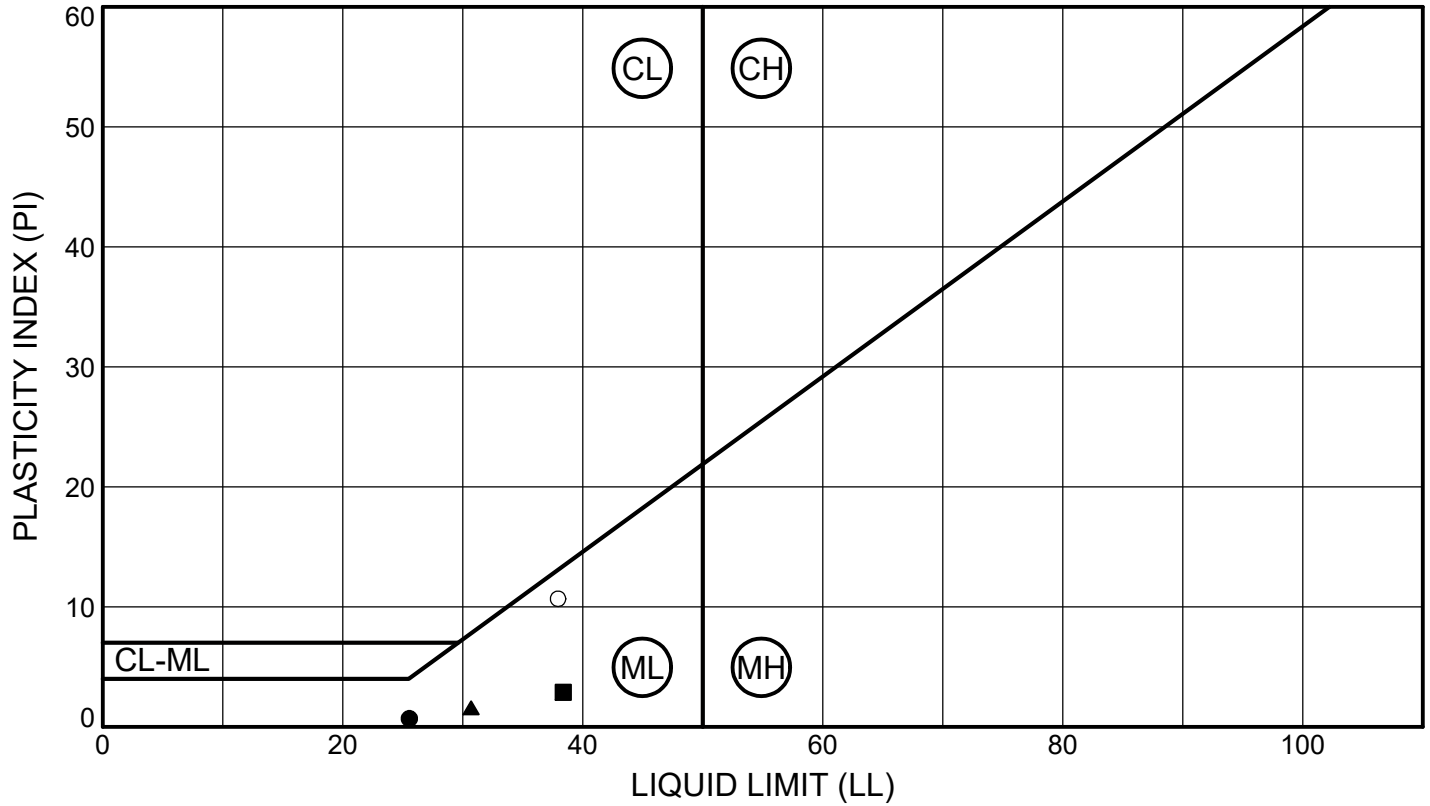
Notes: 1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report test, other graphs and tables, and the exploration logs.
2. The soil classifications in this table are based on ASTM D2487 and D2488 as applicable.

GeoSciences Inc.

MLT for MTC, Inc.
QC - Lower Duwamish Waterway
Client Project No.: 21B233

SUMMARY OF
MATERIAL PROPERTIES

PROJECT NO.: 2012-002 T51 FIGURE: 1



SYMBOL	SAMPLE	DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	LDW21-GT23-GB	28.5 - 30.5	(SM) Dark grayish-brown, silty SAND	33	26	25	1	
■	LDW21-GT33-GB	6.0 - 8.0	(ML) Very dark grayish-brown, SILT with sand	59	38	36	2	
▲	LDW21-GT33-GB	21.0 - 23.0	(SM) Very dark grayish-brown, silty SAND	35	31	29	2	
○	LDW21-GT53-SPT	30.0 - 32.0	(ML) Very dark grayish-brown, SILT with sand	44	38	27	11	

GeoSciences Inc.

MLT for MTC, Inc.
QC - Lower Duwamish Waterway
Client Project No.: 21B233

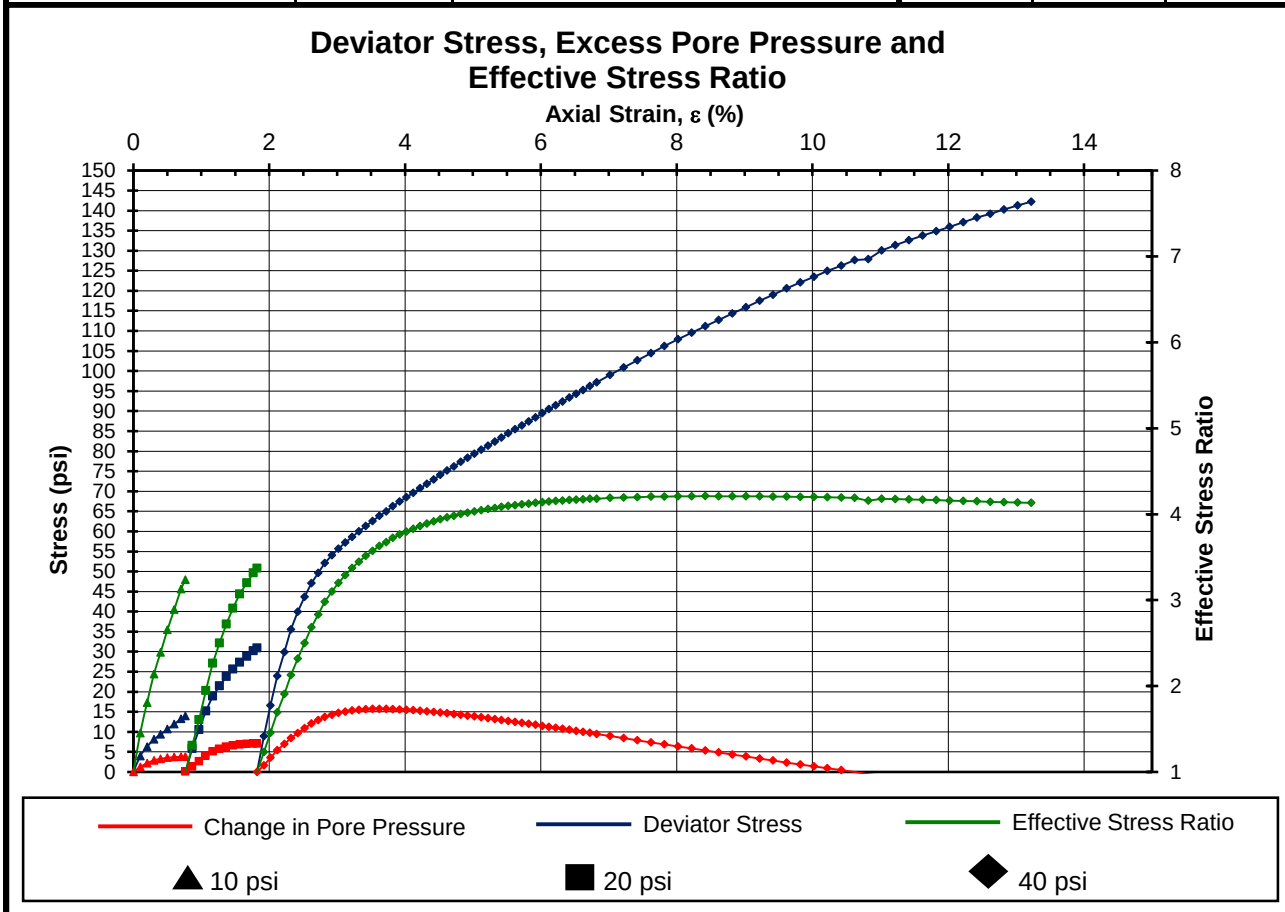
LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

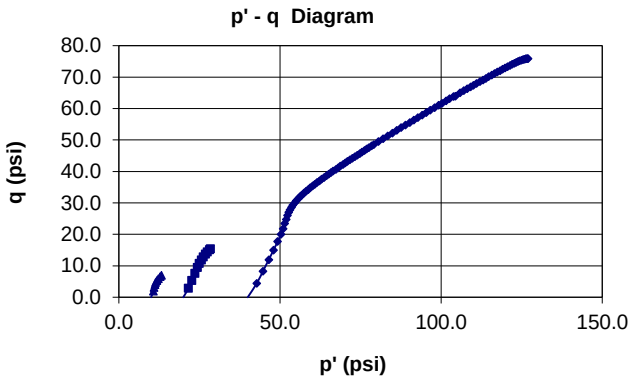
PROJECT NO.: 2012-002 T51 FIGURE: 2

HWA GeoSciences Inc - Materials Testing Laboratory

Consolidated-Undrained Triaxial Compression Test for Cohesive Soils (ASTM D 4767)

Project Name:	Lower Duwamish Waterway			Date:	8/27/2021	
Project No.:	2012-002-23 T51		Exploration ID:		LDW21-GT23-GB	
Technician:	DW		Sample No:		n/a	
Sample Description:	Dark grayish-brown, silty SAND (SM)			Sample Depth, ft:	28.5-30.5'	
Confining Pressures:	**10 psi**	**20 psi**	**40 psi**		Consolidation T50 Values (minutes)	
Initial Moisture:	33.4%	Final Moisture:		32.4%	10 psi	20 psi	40 psi
Initial Wet Density, pcf:	115.2				0.6	0.6	1.0
Initial Dry Density, pcf:	86.3						

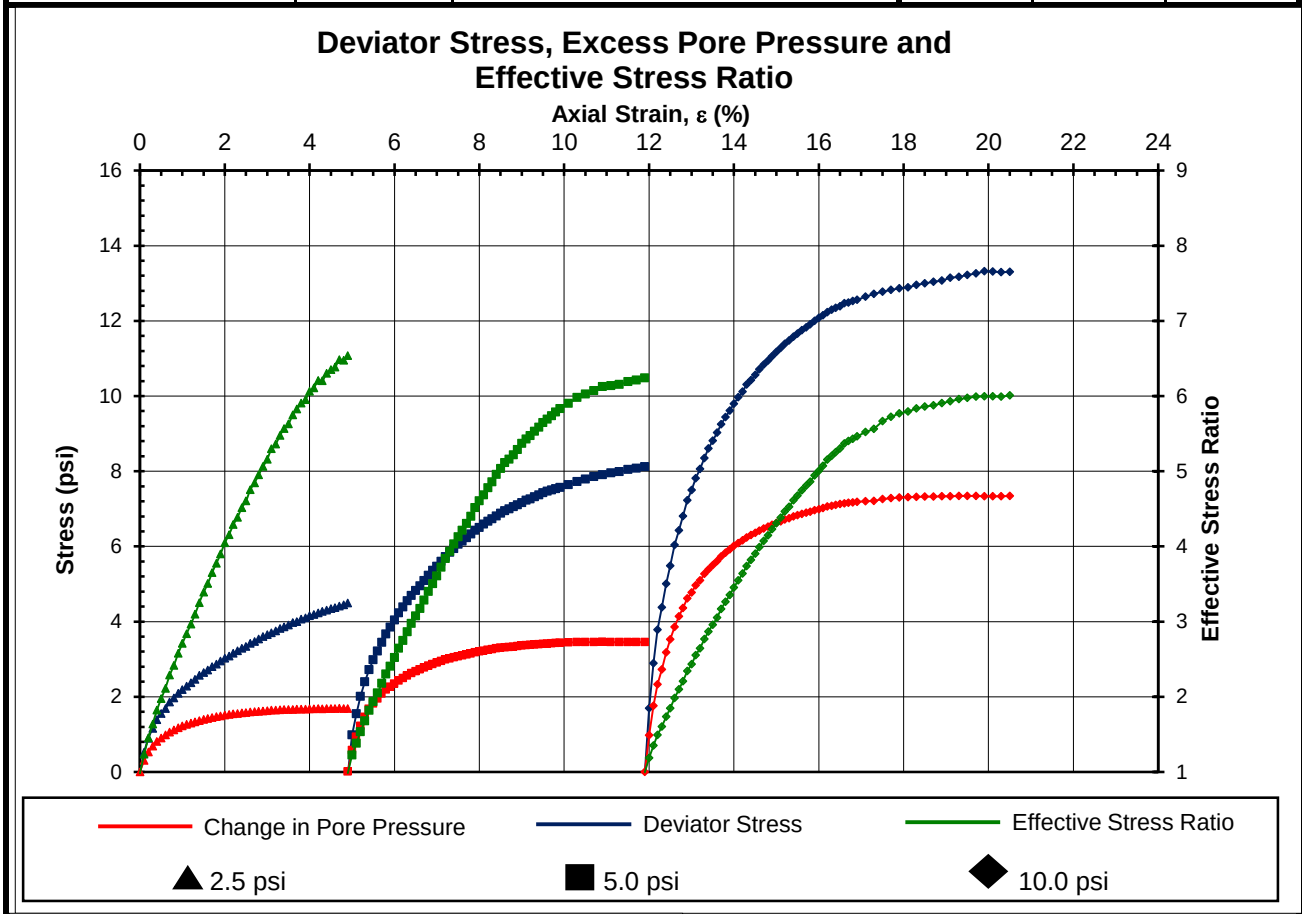


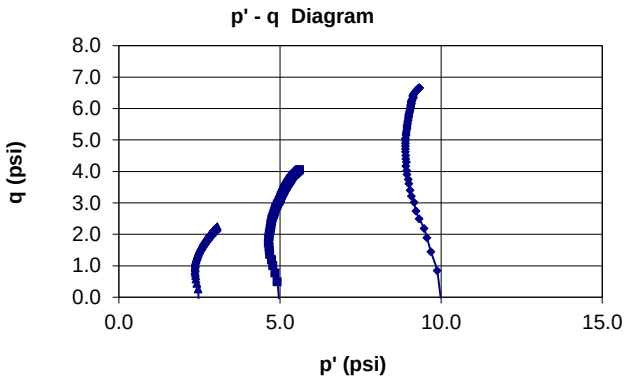


Reviewed by: SEG

Figure 3

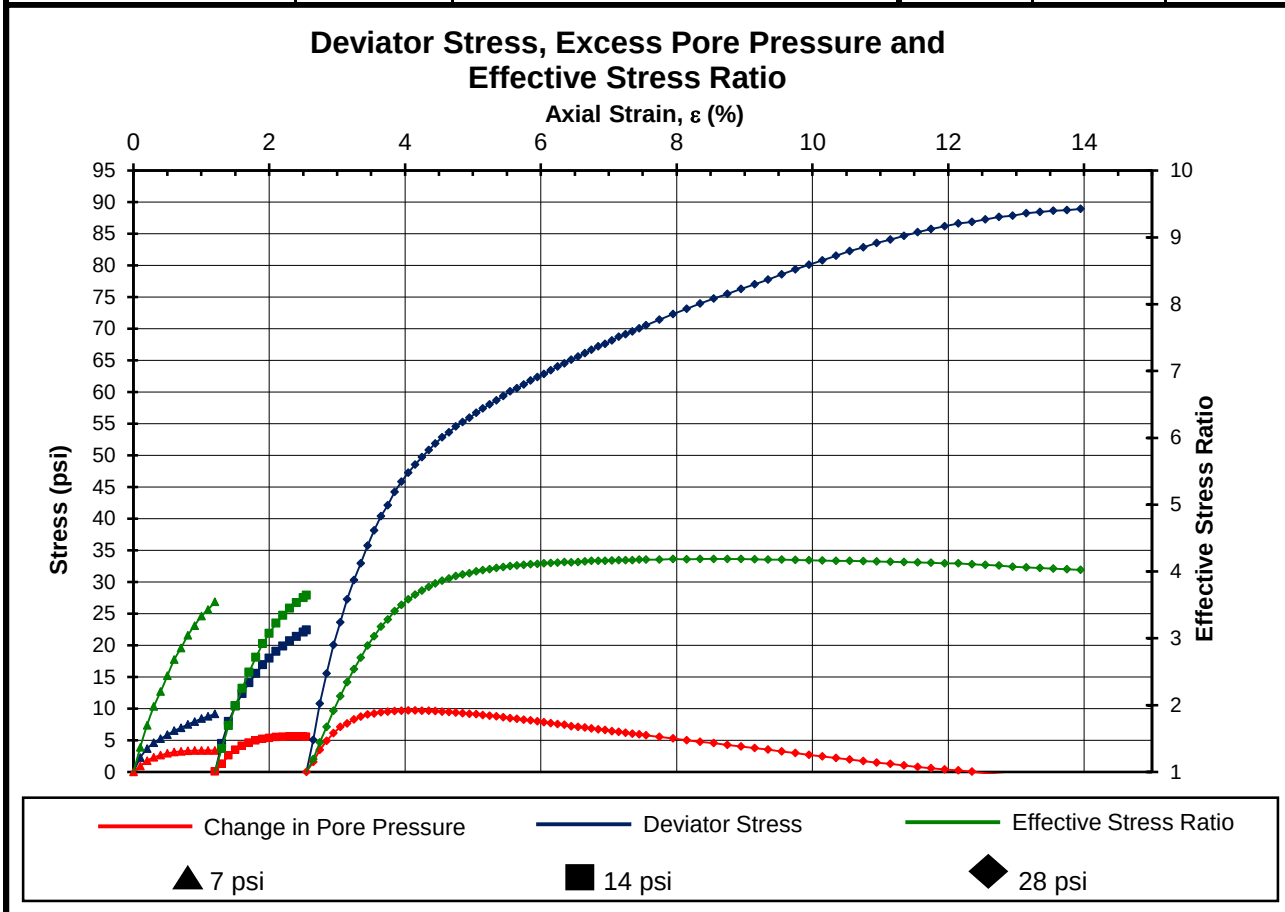
HWA GeoSciences Inc - Materials Testing Laboratory						
Consolidated-Undrained Triaxial Compression Test for Cohesive Soils (ASTM D 4767)						
Project Name:	Lower Duwamish Waterway			Date:	8/28/2021	
Project No.:	2012-002-23 T51		Exploration ID:		LDW21-GT33-GB	
Technician:	GB		Sample No:		n/a	
Sample Description:	Very dark grayish-brown, SILT with sand (ML)			Sample Depth, ft:	6.0 - 8.0	
Confining Pressures:	**2.5 psi**	**5.0 psi**	**10.0 psi**		Consolidation T50 Values (minutes)	
Initial Moisture:	64.8%	Final Moisture:		see report	2.5 psi	5.0 psi	10.0 psi
Initial Wet Density, pcf:	93.4				91.13	83.21	162.0
Initial Dry Density, pcf:	56.7						

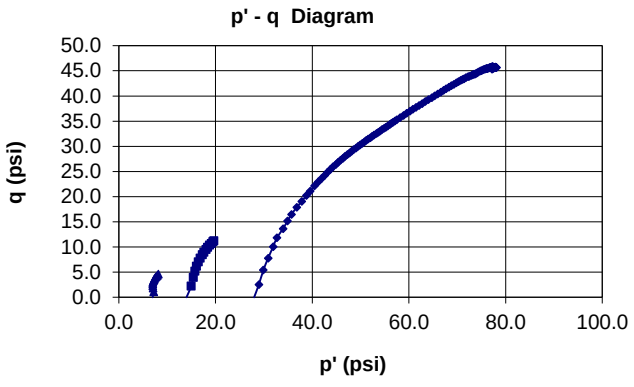




Reviewed by: SEG Figure 4

HWA GeoSciences Inc - Materials Testing Laboratory						
Consolidated-Undrained Triaxial Compression Test for Cohesive Soils (ASTM D 4767)						
Project Name:	Lower Duwamish Waterway			Date:	9/7/2021	
Project No.:	2012-002-23 T51		Exploration ID:		LDW21-GT33-GB	
Technician:	GB		Sample No:		n/a	
Sample Description:	Very dark grayish-brown, silty SAND (SM)			Sample Depth, ft:	21.0-23.0	
Confining Pressures:	**7 psi**	**14 psi**	**28 psi**		Consolidation T50 Values (minutes)	
Initial Moisture:	35.3%	Final Moisture:	34.7%	7 psi	14 psi	28 psi
Initial Wet Density, pcf:	109.6			144.5	23.8	0.3
Initial Dry Density, pcf:	81.0					

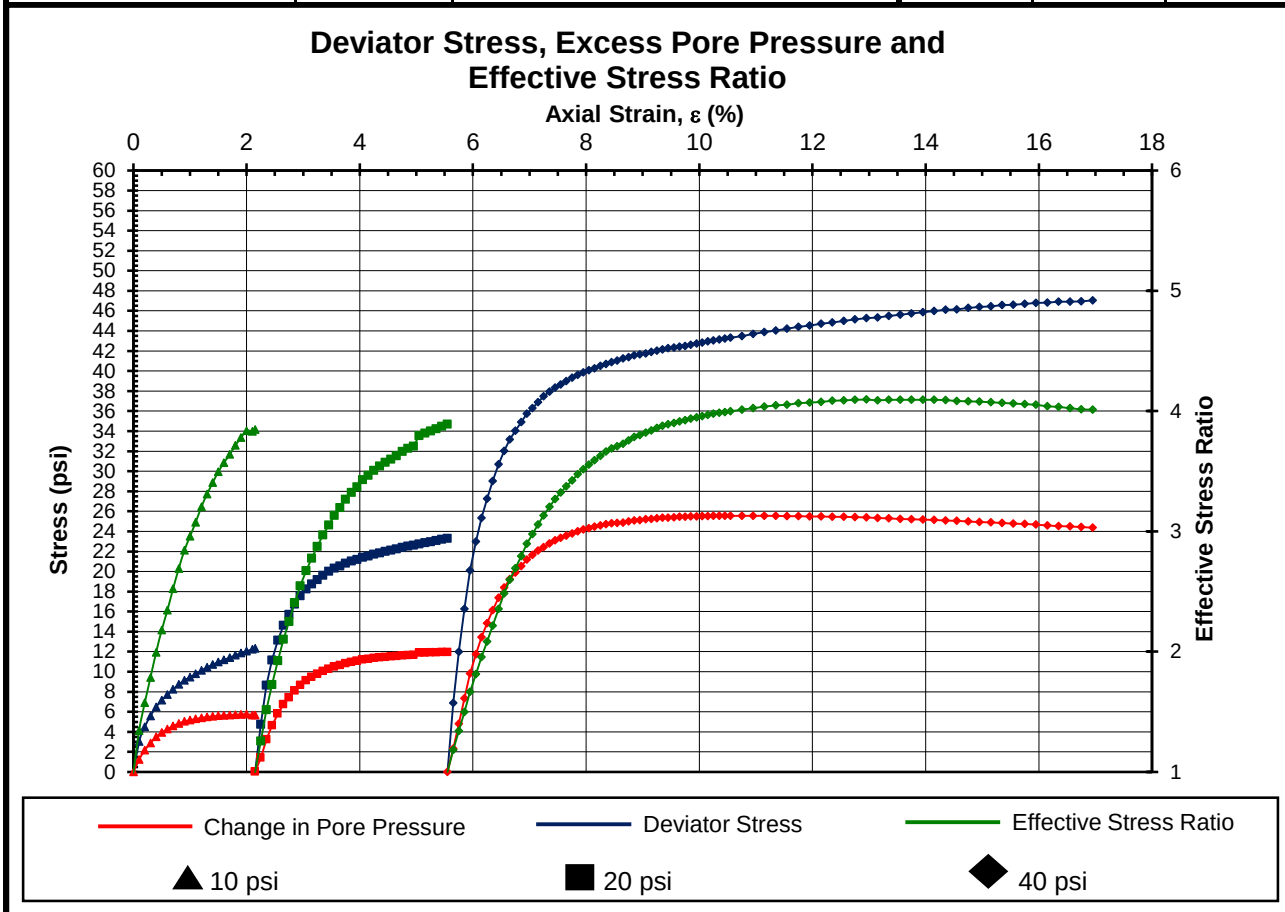


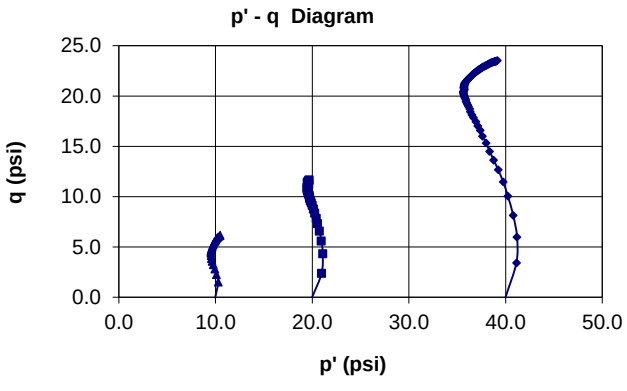


Reviewed by: SEG

Figure 5

HWA GeoSciences Inc - Materials Testing Laboratory						
Consolidated-Undrained Triaxial Compression Test for Cohesive Soils (ASTM D 4767)						
Project Name:	Lower Duwamish Waterway			Date:	9/16/2021	
Project No.:	2012-002-23 T51		Exploration ID:		LDW21-GT53-SPT	
Technician:	GB		Sample No:		n/a	
Sample Description:	Very dark grayish-brown, SILT with sand (ML)			Sample Depth, ft:	30.0-32.0	
Confining Pressures:	**10 psi**	**20 psi**	**40 psi**		Consolidation T50 Values (minutes)	
Initial Moisture:	43.6%	Final Moisture:		36.3%	10 psi	20 psi	40 psi
Initial Wet Density, pcf:	112.3				10.13	5.5	15.3
Initial Dry Density, pcf:	78.2						

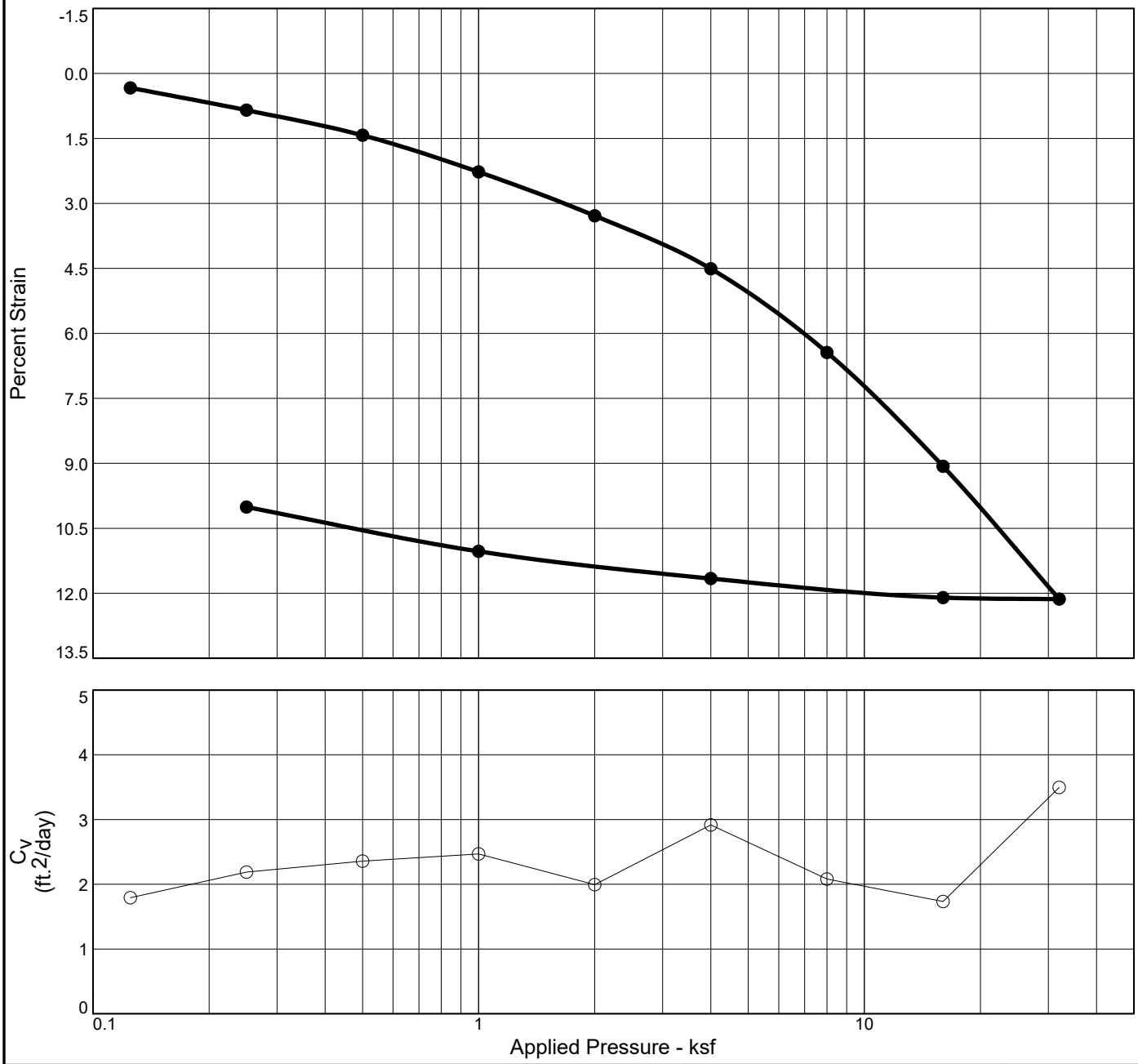




Reviewed by: SEG

Figure 6

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
89.4 %	33.3 %	82.8	26	1	2.617	SM		0.973

MATERIAL DESCRIPTION

Dark grayish-brown, Silty SAND

Project No. 2012-002 **Client:** MTC

Project: MLT for MTC
Lower Duwamish River

Source of Sample: LDW21-GT23-GB **Depth:** 28.5

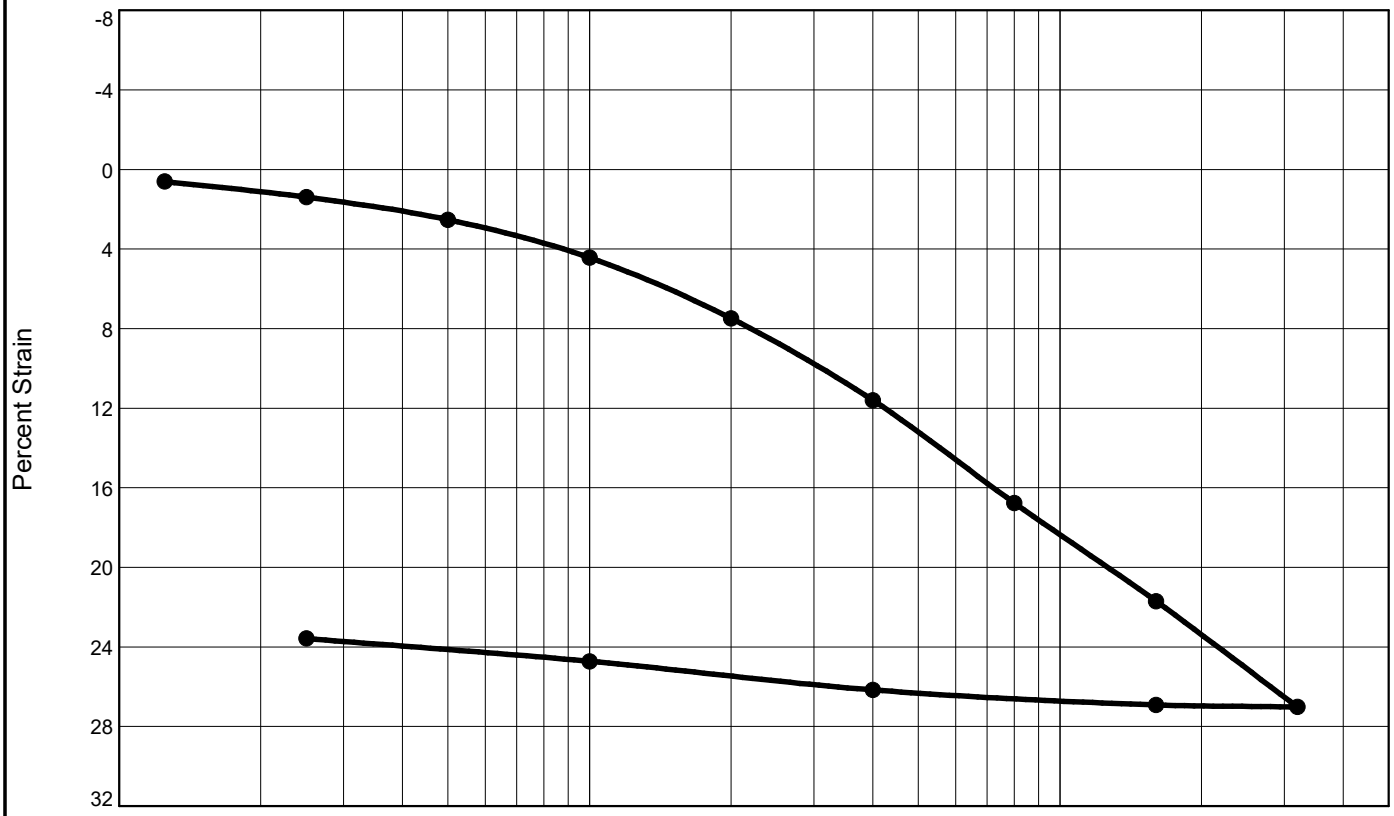
Remarks:
Specific Gravity determined per ASTM D854

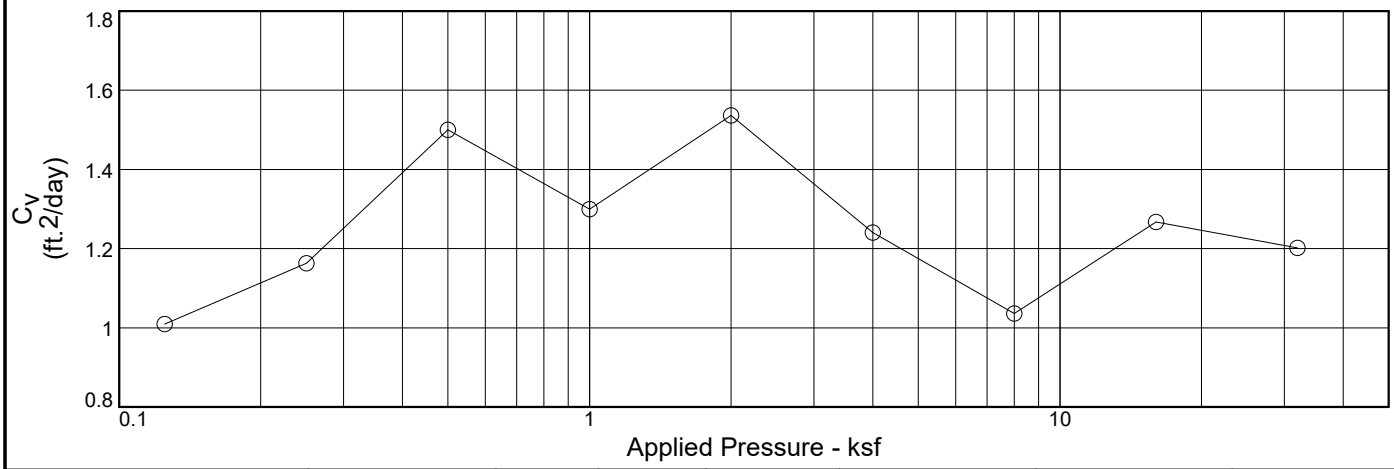
HWA GeoSciences Inc. DBE/MWBE

Figure 7

Tested By: AH/GB **Checked By:** SEG

CONSOLIDATION TEST REPORT





Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
97.9 %	58.6 %	64.3	38	2	2.612	ML		1.564

MATERIAL DESCRIPTION

Very dark grayish-brown, SILT with sand

Project No. 2012-002 **Client:** MTC

Project: MLT for MTC
Lower Duwamish River

Source of Sample: LDW21-GT33-GB **Depth:** 6.0

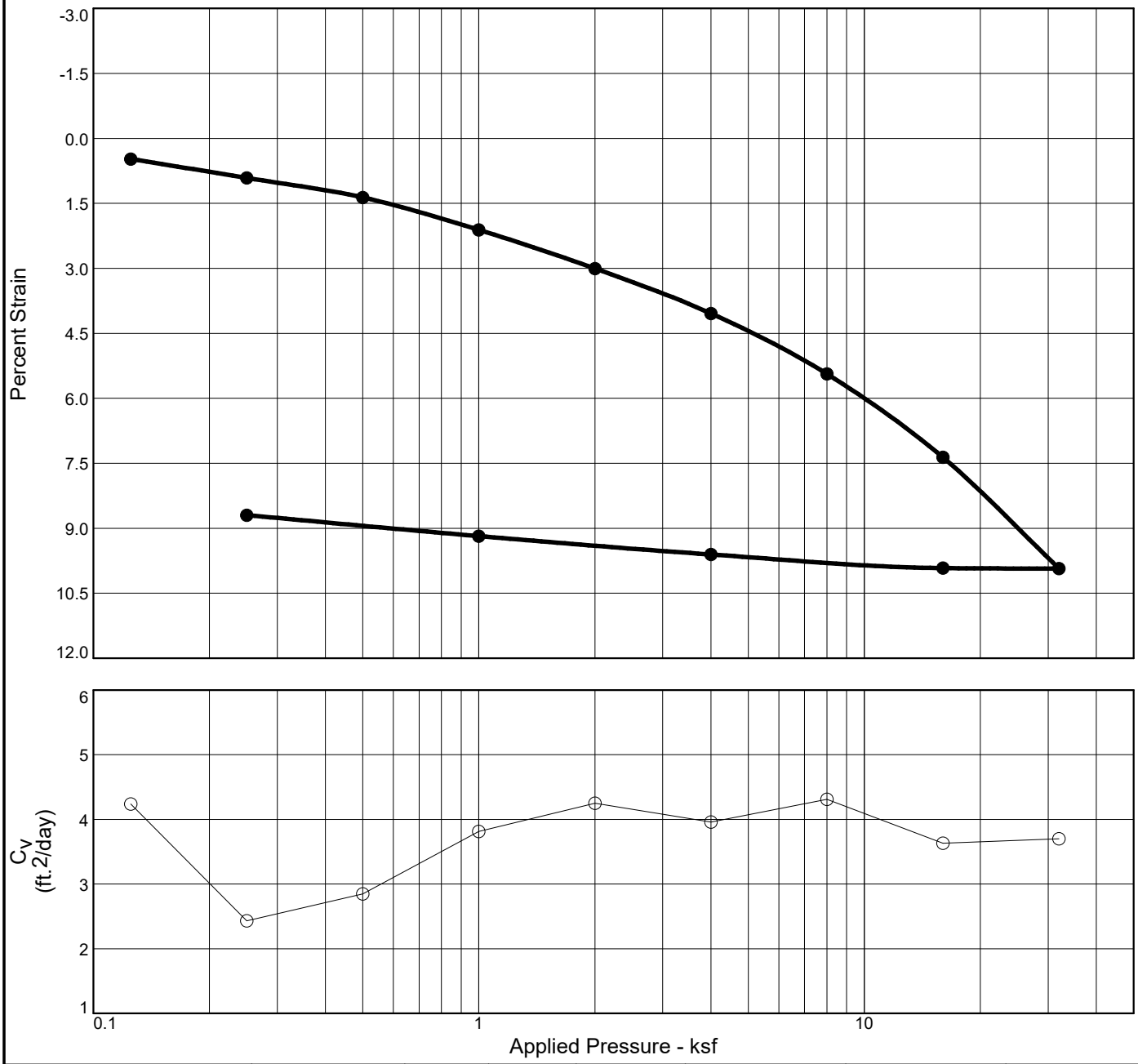
HWA GeoSciences Inc.
DBE/MWBE

Remarks:
Specific Gravity determined per ASTM D854

Figure 8

Tested By: GB

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
96.4 %	35.3 %	87.0	31	2	2.643	SM		0.968

MATERIAL DESCRIPTION

Very dark grayish-brown, silty SAND

Project No. 2012-002 **Client:** MTC

Project: MLT for MTC
Lower Duwamish River

Source of Sample: LDW21-GT33-GB **Depth:** 21.0

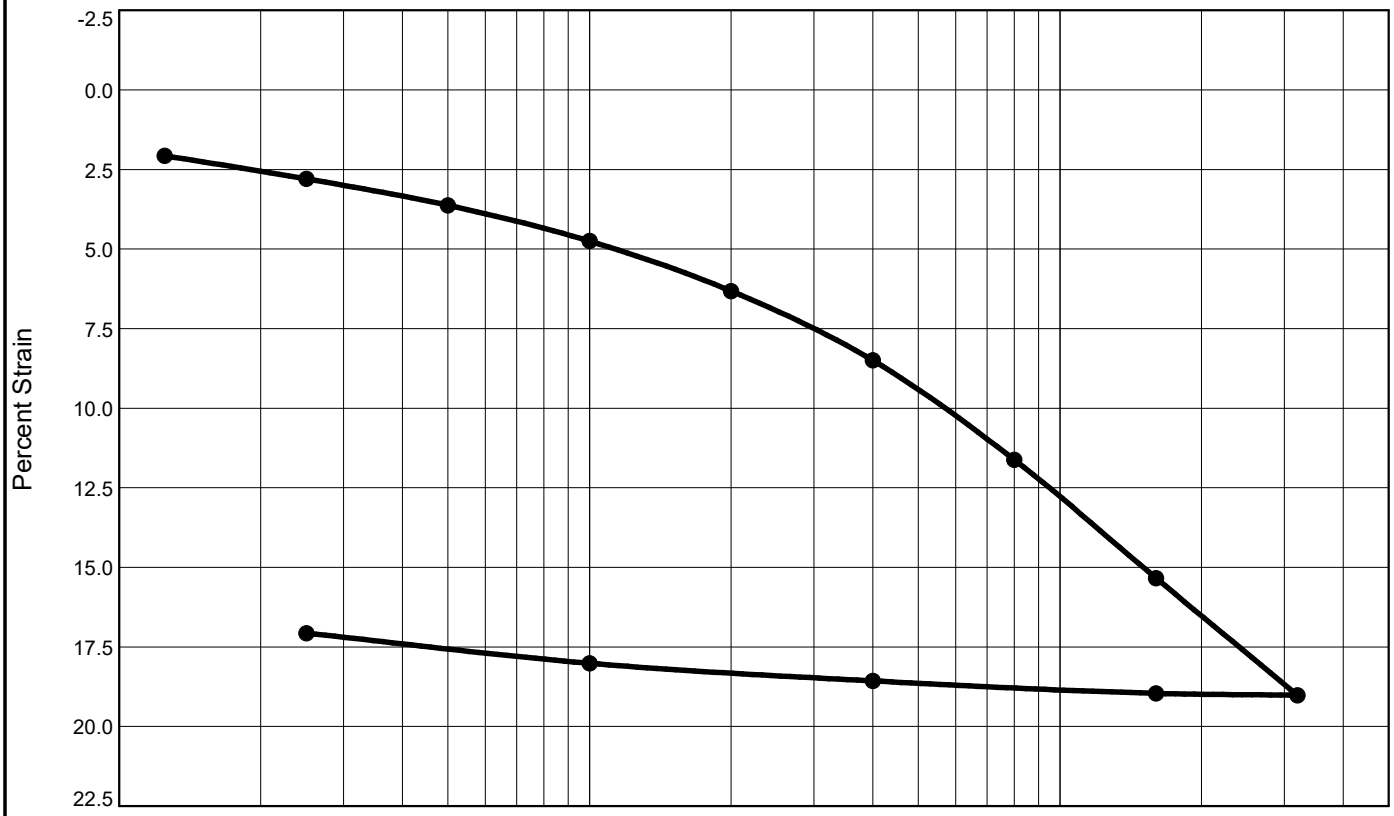
HWA GeoSciences Inc. DBE/MWBE

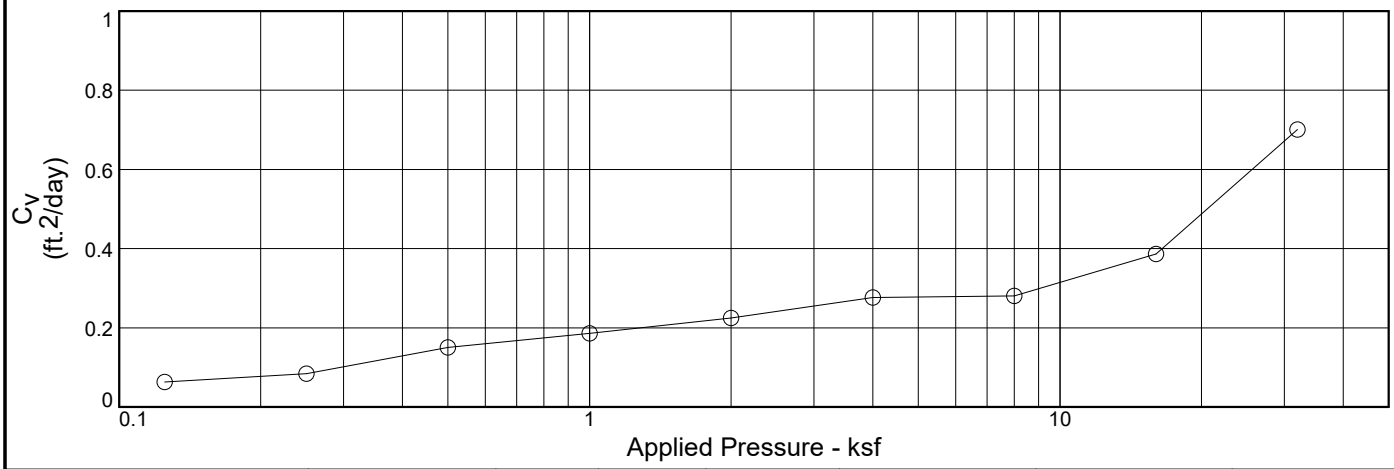
Remarks:
Specific Gravity determined per ASTM D854

Figure 9

Tested By: GB **Checked By:** SEG

CONSOLIDATION TEST REPORT





Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
108.4 %	43.6 %	82.0	38	11	2.627	ML		1.058

MATERIAL DESCRIPTION

Very dark grayish-brown, SILT wtih sand

Project No. 2012-002 **Client:** MTC

Project: MLT for MTC
Lower Duwamish River

Source of Sample: LDW21-GT53-SPT **Depth:** 30.0

HWA GeoSciences Inc. DBE/MWBE

Remarks:
Specific Gravity determined per ASTM D854

Figure 10

Tested By: GB **Checked By:** SEG

Client:	Anchor QEA	**Date:**	October 22, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-2006 - 2020
Revised on:		**Date sampled:**	7-19-21 & 7-20-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Date Received: July 29, 2021
Date Tested: October 5, 2021

Client: Anchor QEA
Sampled by: Client
Tested by: M. Carrillo

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-2006	LDW21-GT5-0-1.5 ft	233.4	758.3	626.0	132.3	392.6	33.7%
B21-2007	LDW21-GT5-0-7.5 ft	266.3	675.6	572.3	103.3	306.0	33.8%
B21-2008	LDW21-GT5-7.5-9 ft	270.2	918.2	773.3	144.9	503.1	28.8%
B21-2009	LDW21-GT5-7.5-17.2ft	215.7	960.7	862.1	98.6	646.4	15.3%
B21-2010	LDW21-GT5-17.2-17.5 ft	300.9	721.1	625.3	95.8	324.4	29.5%
B21-2011	LDW21-GT5-17.5-19 ft	346.3	836.3	746.0	90.3	399.7	22.6%
B21-2012	LDW21-GT5-17.5-27.5 ft	341.8	961.5	816.3	145.2	474.5	30.6%
B21-2013	LDW21-GT5-27.5-29 ft	356.9	833.5	719.1	114.4	362.2	31.6%
B21-2014	LDW21-GT35-0-1.5 ft	360.3	821.8	607.9	213.9	247.6	86.4%
B21-2015	LDW21-GT35-5-6.5 ft	354.1	572.7	469.6	103.1	115.5	89.3%
B21-2016	LDW21-GT35-10-11.5 ft	359.4	882.4	671.2	211.2	311.8	67.7%
B21-2017	LDW21-GT35-15-16.5 ft	236.6	466.5	417.1	49.4	180.5	27.4%
B21-2018	LDW21-GT35-20-21.5 ft	237.4	947.7	793.9	153.8	556.5	27.6%
B21-2019	LDW21-GT35-25-26.5 ft	224.2	733.1	614.5	118.6	390.3	30.4%
B21-2020	LDW21-GT35-30-31.5 ft	225.1	669.4	560.4	109.0	335.3	32.5%

Reviewed by: Meghan Blodgett-Carrillo

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: October 5, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-2009	LDW21-GT5-7.5-17.2ft	601.79	703.81	102.0	TSA-022	198.0	499.5	0.99865	760.54	696.77	17.7	2.6674865	1.00045	2.6686868
B21-2012	LDW21-GT5-17.5-27.5 ft	497.70	600.26	102.6	TSA-021	183.4	499.4	0.99869	744.61	682.18	17.6	2.5559632	1.00048	2.5571901
B21-2017	LDW21-GT35-15-16.5 ft	509.68	611.88	102.2	TSA-023	163.9	498.7	0.99865	724.72	661.99	17.7	2.5895248	1.00045	2.5906901

Reviewed by: Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	14-Oct-21
Source:	LDW21-GT5-GB-0-7.5 ft	**Tested By:**	A. Eifrig
Sample #:	B21-2007		

Visual Identification
Sand with Silt
Sample Color
brown

Liquid Limit Determination

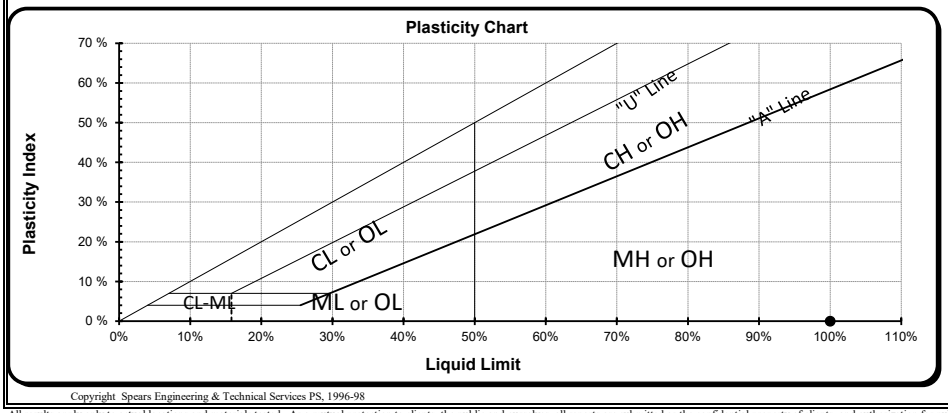
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Liquid limit cannot be established					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

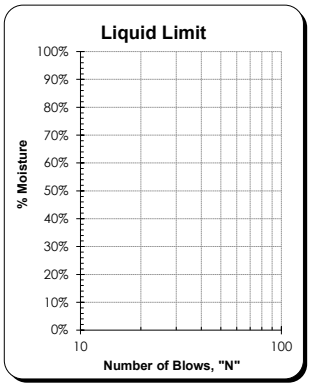
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumblind. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT5-GB-7.5-17.2 ft
Sample#: B21-2009

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 6-Oct-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487
SW-SM, Well-graded Sand with Silt and Gravel
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

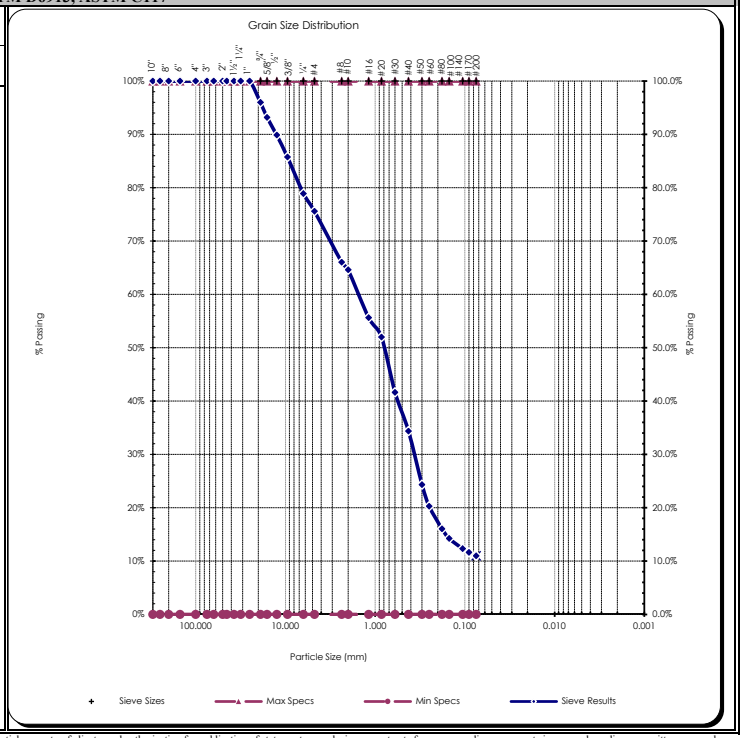
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.034	mm	% Gravel =	24.4%	Coeff. of Curvature, C_C = 1.27
$D_{(10)}$ =	0.068	mm	% Sand =	64.6%	Coeff. of Uniformity, C_U = 23.13
$D_{(15)}$ =	0.162	mm	% Silt & Clay =	11.0%	Fineness Modulus = 3.41
$D_{(30)}$ =	0.370	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.801	mm	Plasticity Index =	n/a	Moisture %, as sampled = 15.3%
$D_{(60)}$ =	1.580	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	12.641	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	23/72		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	96%	96%	100.0%	0.0%
5/8"	16.00		93%	100.0%	0.0%
1/2"	12.50	90%	90%	100.0%	0.0%
3/8"	9.50	86%	86%	100.0%	0.0%
1/4"	6.30		79%	100.0%	0.0%
#4	4.75	76%	76%	100.0%	0.0%
#8	2.36		66%	100.0%	0.0%
#10	2.00	65%	65%	100.0%	0.0%
#16	1.18		56%	100.0%	0.0%
#20	0.850	52%	52%	100.0%	0.0%
#30	0.600		42%	100.0%	0.0%
#40	0.425	34%	34%	100.0%	0.0%
#50	0.300		24%	100.0%	0.0%
#60	0.250	20%	20%	100.0%	0.0%
#80	0.180		16%	100.0%	0.0%
#100	0.150	14%	14%	100.0%	0.0%
#140	0.106		12%	100.0%	0.0%
#170	0.090		12%	100.0%	0.0%
#200	0.075	11.0%	11.0%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

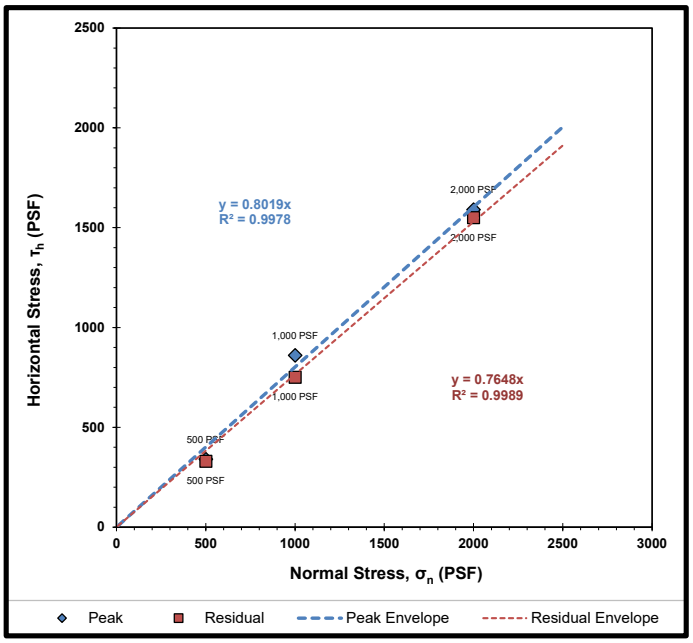
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT5-GB-7.5-17.2 ft
Laboratory Sample ID:	B21-2009	**Visual Soil Description:**	brown sand
Sample Date:	7/19/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	10/12/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	25.3	
	Initial	**Post-Consolidation**
Dry Density (PCF):	106.6	108.7
Void Ratio:	0.580	0.549
Porosity (%):	36.7	35.5
Degree of Saturation (%):	saturated	saturated

Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	25.2	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.2	109.2
Void Ratio:	0.571	0.543
Porosity (%):	36.3	35.2
Degree of Saturation (%):	saturated	saturated

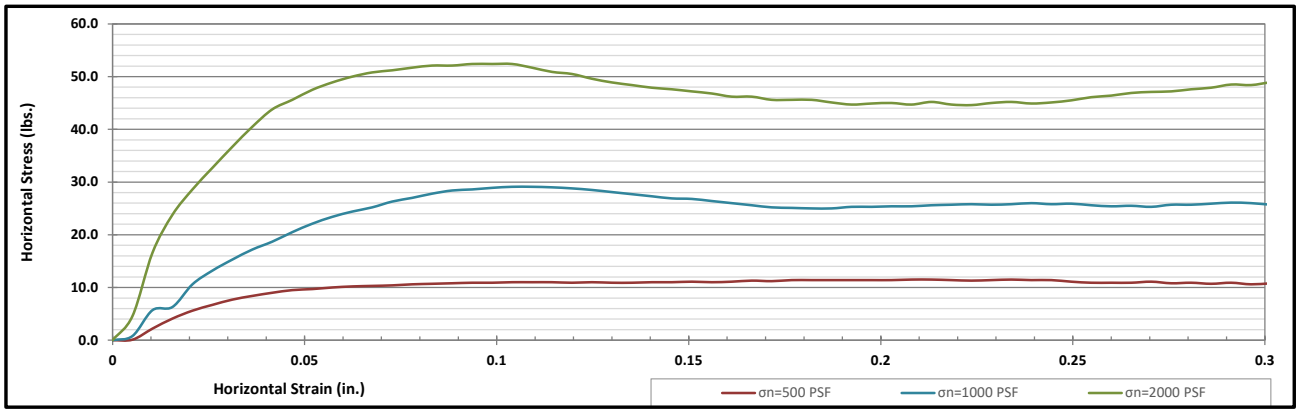
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	25.8	
	Initial	**Post-Consolidation**
Dry Density (PCF):	106.6	109.4
Void Ratio:	0.581	0.540
Porosity (%):	36.7	35.1
Degree of Saturation (%):	saturated	saturated

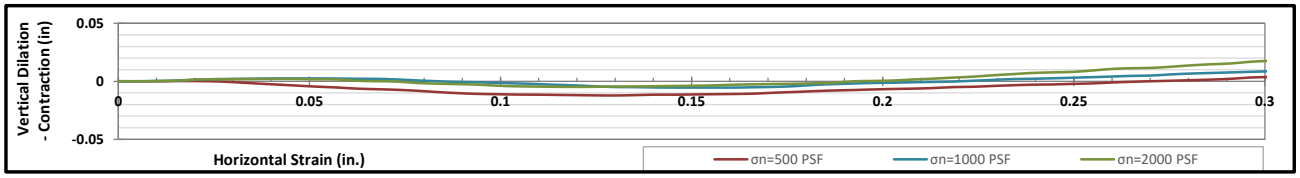


ESTIMATED STRENGTH PARAMETERS

	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**39**	**37**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	340	860	1590
Residual Horizontal Stress, τ_h (PSF):	330	750	1550





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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	14-Oct-21
Source:	LDW21-GT5-GB-17.2-17.5 ft	**Tested By:**	A. Eifrig
Sample #:	B21-2010		

Visual Identification
Sand with Silt
Sample Color
brown

Liquid Limit Determination

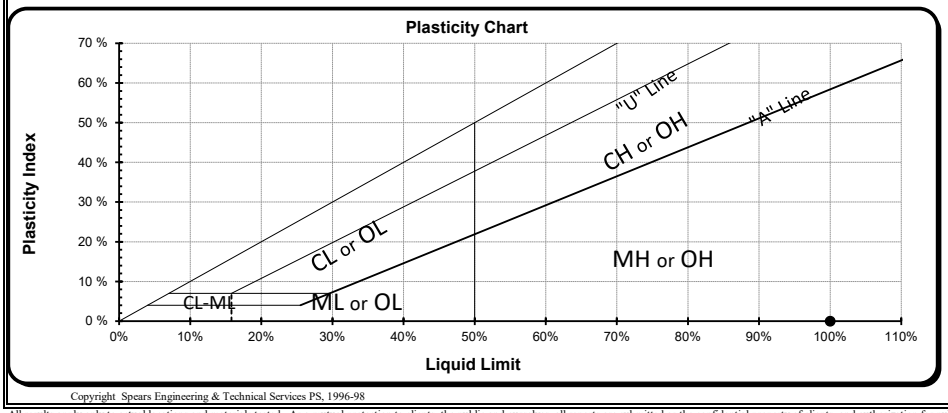
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Liquid limit cannot be established					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

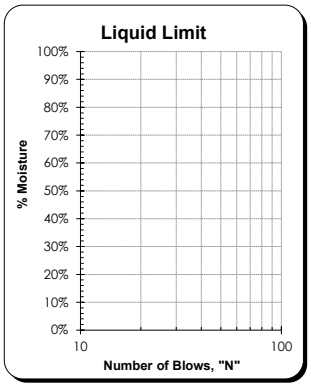
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumblind. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT5-GB-17.5-27.5 ft
Sample#: B21-2012

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 6-Oct-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

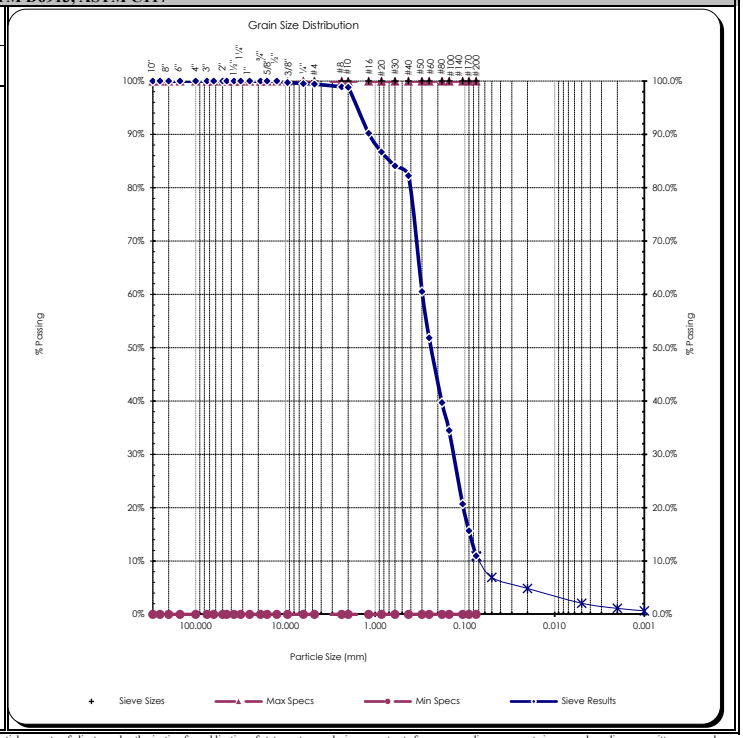
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.022	mm	% Gravel =	0.6%	Coeff. of Curvature, C_C = 0.91
$D_{(10)}$ =	0.068	mm	% Sand =	88.5%	Coeff. of Uniformity, C_U = 4.38
$D_{(15)}$ =	0.088	mm	% Silt & Clay =	11.0%	Fineness Modulus = 1.33
$D_{(30)}$ =	0.136	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.239	mm	Plasticity Index =	n/a	Moisture %, as sampled = 30.6%
$D_{(60)}$ =	0.297	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.161	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	2/15		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		90%	100.0%	0.0%
#20	0.850		87%	100.0%	0.0%
#30	0.600		84%	100.0%	0.0%
#40	0.425	82%	82%	100.0%	0.0%
#50	0.300		61%	100.0%	0.0%
#60	0.250		52%	100.0%	0.0%
#80	0.180		40%	100.0%	0.0%
#100	0.150	35%	35%	100.0%	0.0%
#140	0.106		21%	100.0%	0.0%
#170	0.090		16%	100.0%	0.0%
#200	0.075	11.0%	11.0%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21	**Unified Soil Classification System, ASTM-2487**	
Project #:	21B233	**Sampled By:**	Client	SP-SM, Poorly graded Sand with Silt	
Client :	Anchor QEA	**Date Tested:**	6-Oct-21	**Sample Color**	
Source:	LDW21-GT5-GB-17.5-27.5 ft	**Tested By:**	K. Mendez	brown	
Sample#:	B21-2012				

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr.	2.56	
Sample Weight:	100.01	grams
Hydroscopic Moist.:	1.52%	
Adj. Sample Wgt :	98.51	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	8	8.2%	0.0545 mm
2	6	6.1%	0.0389 mm
5	5	5.1%	0.0248 mm
15	4.5	4.6%	0.0144 mm
30	4	4.1%	0.0102 mm
60	3	3.1%	0.0072 mm
240	1.5	1.5%	0.0036 mm
1440	1	1.0%	0.0015 mm

% Gravel:	0.6%	**Liquid Limit:**	n/a
% Sand:	88.5%	**Plastic Limit:**	n/a
% Silt:	8.9%	**Plasticity Index:**	n/a
% Clay:	2.1%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	99%	4.750 mm
#10	99%	2.000 mm
#20	87%	0.850 mm
#40	82%	0.425 mm
#100	35%	0.150 mm
#200	11.0%	0.075 mm
Silts	10.8%	0.074 mm
	6.9%	0.050 mm
	4.9%	0.020 mm
Clays	2.1%	0.005 mm
	1.1%	0.002 mm
Colloids	0.7%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sand

Comments:

Reviewed by: Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc.

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	14-Oct-21
Source:	LDW21-GT35-GB-5-6.5 ft	**Tested By:**	K. Mendez
Sample #:	B21-2015		

Visual Identification
Clay
Sample Color
brown

Liquid Limit Determination

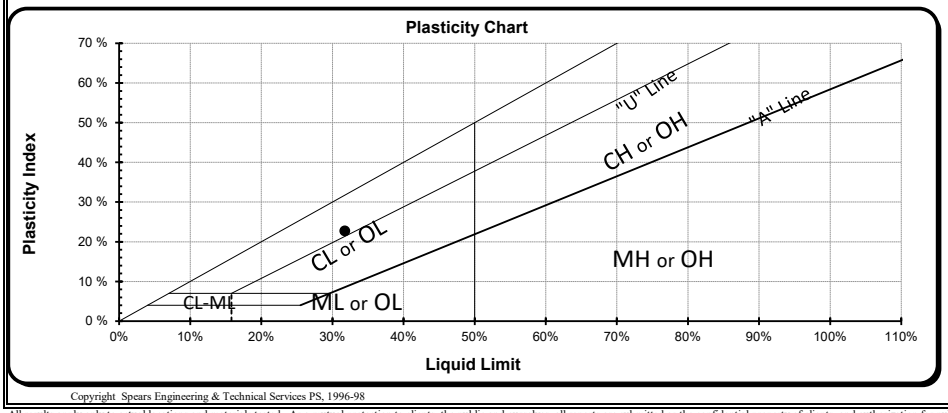
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	30.42	27.71	26.95			
Weight of Dry Soils + Pan:	27.89	24.44	23.66			
Weight of Pan:	19.88	15.05	14.81			
Weight of Dry Soils:	8.01	9.39	8.85			
Weight of Moisture:	2.53	3.27	3.29			
% Moisture:	31.6 %	34.8 %	37.2 %			
Number of Blows:	25	20	15			

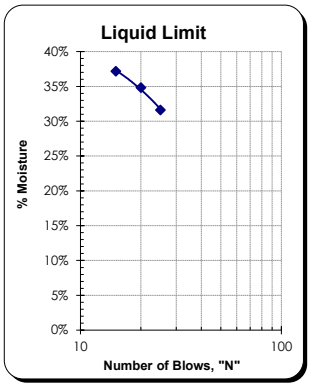
Liquid Limit @ 25 Blows: 32 %
Plastic Limit: 9 %
Plasticity Index, I_P: 23 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	37.34	36.36				
Weight of Dry Soils + Pan:	36.82	35.86				
Weight of Pan:	31.03	30.33				
Weight of Dry Soils:	5.79	5.53				
Weight of Moisture:	0.52	0.50				
% Moisture:	9.0 %	9.0 %				

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: _____

Reviewed by: Meghan Blodgett-Carrillo

Meghan Blodgett-Carrillo

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Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974

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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT35-GB-15-16.5 ft
Sample#: B21-2017

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 6-Oct-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
gray

ACCREDITED
Certificate #: 1366.01

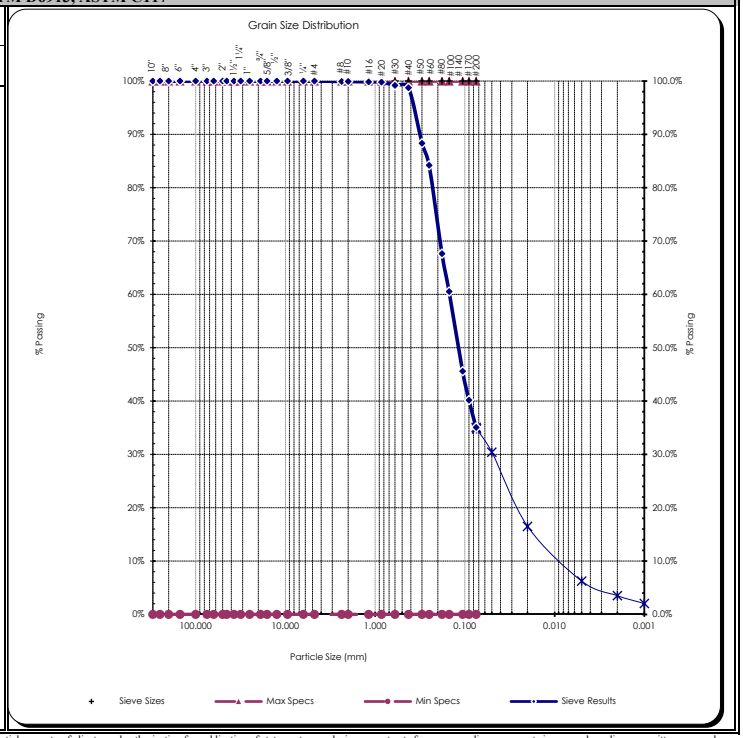
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.004	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 2.36
$D_{(10)}$ =	0.009	mm	% Sand =	64.9%	Coeff. of Uniformity, C_U = 16.11
$D_{(15)}$ =	0.017	mm	% Silt & Clay =	35.1%	Fineness Modulus = 0.52
$D_{(30)}$ =	0.057	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.119	mm	Plasticity Index =	n/a	Moisture %, as sampled = 27.4%
$D_{(60)}$ =	0.148	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.320	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	11/31		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850	100%	100%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		88%	100.0%	0.0%
#60	0.250	84%	84%	100.0%	0.0%
#80	0.180		68%	100.0%	0.0%
#100	0.150	61%	61%	100.0%	0.0%
#140	0.106		46%	100.0%	0.0%
#170	0.090		40%	100.0%	0.0%
#200	0.075	35.1%	35.1%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21	**Unified Soil Classification System, ASTM-2487**	
Project #:	21B233	**Sampled By:**	Client	SM, Silty Sand	
Client :	Anchor QEA	**Date Tested:**	6-Oct-21	**Sample Color**	
Source:	LDW21-GT35-GB-15-16.5 ft	**Tested By:**	K. Mendez	gray	
Sample#:	B21-2017				

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr.	2.59	
Sample Weight:	102.29	grams
Hydroscopic Moist.:	1.10%	
Adj. Sample Wgt :	101.18	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	27.5	27.7%	0.0486 mm
2	23	23.2%	0.0352 mm
5	18	18.1%	0.0230 mm
15	13	13.1%	0.0137 mm
30	10.5	10.6%	0.0099 mm
60	8	8.1%	0.0070 mm
240	5	5.0%	0.0036 mm
1440	3	3.0%	0.0015 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	64.9%	**Plastic Limit:**	n/a
% Silt:	28.8%	**Plasticity Index:**	n/a
% Clay:	6.3%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	100%	0.850 mm
#40	99%	0.425 mm
#100	61%	0.150 mm
#200	35.1%	0.075 mm
Silts	34.8%	0.074 mm
	30.4%	0.050 mm
	16.5%	0.020 mm
Clays	6.3%	0.005 mm
	3.5%	0.002 mm
Colloids	2.0%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sandy Loam

Comments:

Reviewed by: Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

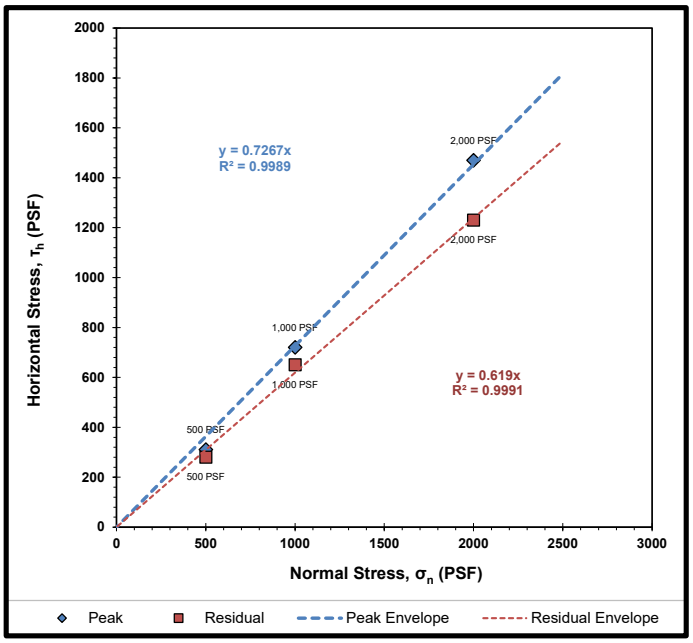
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT35-GB-15-16.5 ft
Laboratory Sample ID:	B21-2017	**Visual Soil Description:**	gray sand
Sample Date:	7/20/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	10/6/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	29.5	
	Initial	**Post-Consolidation**
Dry Density (PCF):	109.5	110.5
Void Ratio:	0.539	0.525
Porosity (%):	35.0	34.4
Degree of Saturation (%):	saturated	saturated

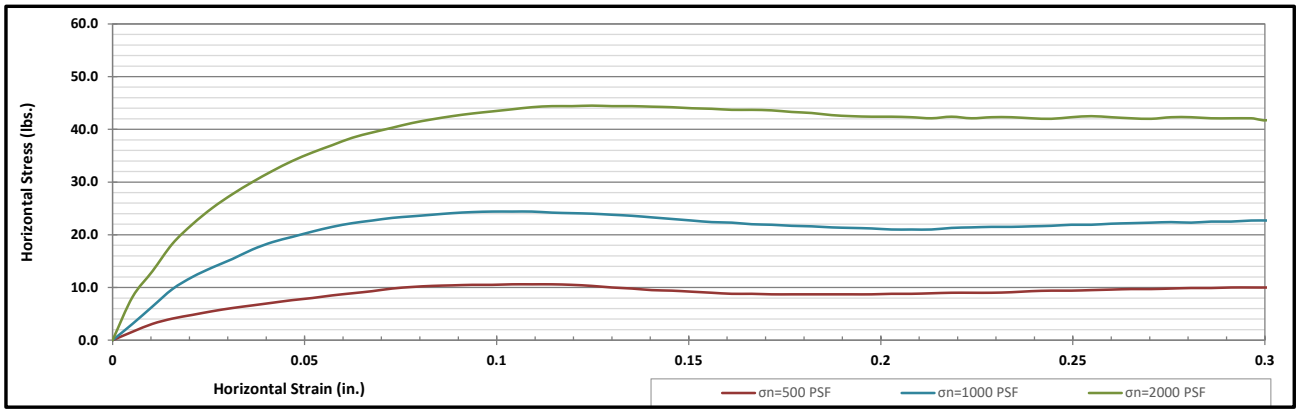
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	30.1	
	Initial	**Post-Consolidation**
Dry Density (PCF):	108.1	110.4
Void Ratio:	0.559	0.527
Porosity (%):	35.8	34.5
Degree of Saturation (%):	saturated	saturated

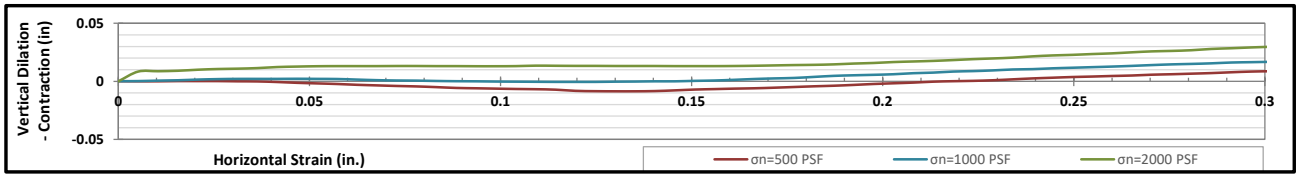
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	32.2	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.5	110.7
Void Ratio:	0.567	0.522
Porosity (%):	36.2	34.3
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**36**	**32**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	310	720	1470
Residual Horizontal Stress, τ_h (PSF):	280	650	1230





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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT35-GB-20-21.5 ft
Sample#: B21-2018

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 6-Oct-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

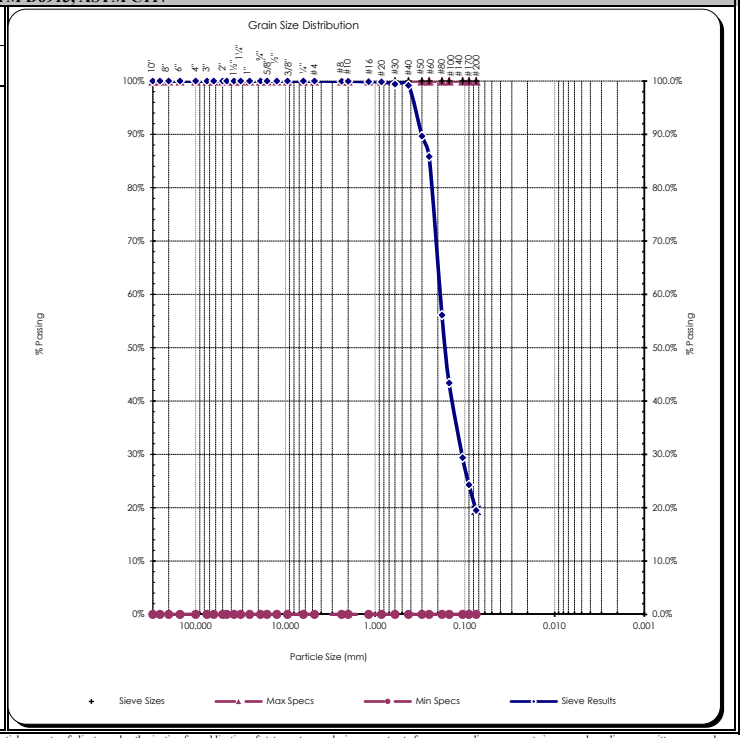
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.019	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.60
$D_{(10)}$ =	0.038	mm	% Sand =	80.5%	Coeff. of Uniformity, C_U = 4.92
$D_{(15)}$ =	0.058	mm	% Silt & Clay =	19.5%	Fineness Modulus = 0.68
$D_{(30)}$ =	0.108	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.166	mm	Plasticity Index =	n/a	Moisture %, as sampled = 27.6%
$D_{(60)}$ =	0.189	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.304	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	13/66		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850	100%	100%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		90%	100.0%	0.0%
#60	0.250	86%	86%	100.0%	0.0%
#80	0.180		56%	100.0%	0.0%
#100	0.150	43%	43%	100.0%	0.0%
#140	0.106		29%	100.0%	0.0%
#170	0.090		24%	100.0%	0.0%
#200	0.075	19.5%	19.5%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc.

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	14-Oct-21
Source:	LDW21-GT35-GB-30-31.5 ft	**Tested By:**	A. Eifrig
Sample #:	B21-2020		

Visual Identification
Silty Sand
Sample Color
brown

Liquid Limit Determination

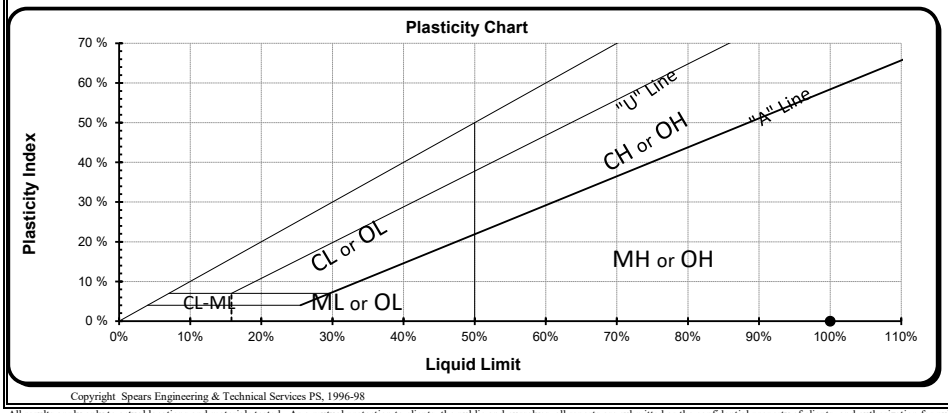
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Liquid limit cannot be established					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

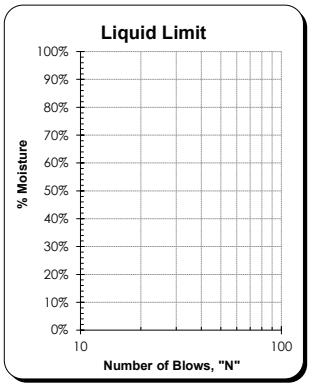
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Plastic limit cannot be determined					
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumblind. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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Client:	Anchor QEA	**Date:**	October 25, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-2143-2162
Revised on:		**Date sampled:**	August 5, 2021

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: October 15, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-2143	LDW21-GT48-GB-21.6-25 ft	234.6	512.3	437.5	74.8	202.9	36.9%
B21-2144	LDW21-GT48-GB-25-30 ft	221.6	1232.1	959.0	273.1	737.4	37.0%
B21-2145	LDW21-GT48-GB-30-35 ft	215.3	1034.5	826.3	208.2	611.0	34.1%
B21-2146	LDW21-GT48-GB-35-36.5 ft	235.3	1073.2	832.7	240.5	597.4	40.3%
B21-2147	LDW21-GT53-GB-0-1.5 ft	228.9	845.1	638.7	206.4	409.8	50.4%
B21-2148	LDW21-GT53-GB-0-5 ft	208.5	682.6	526.4	156.2	317.9	49.1%
B21-2149	LDW21-GT53-GB-5-6.5 ft	222.9	1006.1	801.8	204.3	578.9	35.3%
B21-2150	LDW21-GT53-GB-5-10 ft	229.4	762.5	595.5	167.0	366.1	45.6%
B21-2151	LDW21-GT53-GB-10-15 ft	221.1	1092.3	749.6	342.7	528.5	64.8%
B21-2152	LDW21-GT53-GB-15-20 ft	220.4	805.0	678.3	126.7	457.9	27.7%
B21-2153	LDW21-GT53-GB-20-23.5 ft	222.9	998.0	819.4	178.6	596.5	29.9%
B21-2154	LDW21-GT53-GB-23.5-25 ft	217.3	990.1	795.4	194.7	578.1	33.7%
B21-2155	LDW21-GT53-GB-25-28.6 ft	222.6	807.8	656.4	151.4	433.8	34.9%
B21-2156	LDW21-GT53-GB-28.6-30 ft	224.3	929.6	800.4	129.2	576.1	22.4%
B21-2157	LDW21-GT48-SPT-0-0.7 ft	268.9	742.1	658.8	83.3	389.9	21.4%
B21-2158	LDW21-GT48-SPT-0.7-1.5 ft	310.9	685.1	612.8	72.3	301.9	23.9%
B21-2159	LDW21-GT48-SPT-10-11.5 ft	319.8	870.6	717.8	152.8	398.0	38.4%
B21-2160	LDW21-GT48-SPT-15-16.5 ft	301.0	852.0	723.3	128.7	422.3	30.5%
B21-2161	LDW21-GT48-SPT-20-20.6 ft	302.0	675.6	567.7	107.9	265.7	40.6%
B21-2162	LDW21-GT48-SPT-20.6-21.5 ft	303.2	829.7	715.1	114.6	411.9	27.8%

Reviewed by: Meghan Blodgett-Carrillo

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Moisture Content - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: October 16, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-2143	LDW21-GT48-GB-21.6-25 ft	420.68	495.04	74.4	TSA-010	180.3	499.5	0.99854	725.29	679.12	18.3	2.6377506	1.00034	2.6386475
B21-2148	LDW21-GT53-GB-0-5 ft	413.74	512.57	98.8	TSA-011	190.3	499.5	0.99856	747.85	689.15	18.3	2.4627054	1.00035	2.4635674
B21-2152	LDW21-GT53-GB-15-20 ft	379.63	483.20	103.6	TSA-017	187.9	499.4	0.99841	751.03	686.50	19.1	2.6531994	1.00020	2.65373
B21-2155	LDW21-GT53-GB-25-28.6 ft	394.13	472.87	78.7	TSA-022	198.0	499.5	0.99856	743.69	696.72	18.3	2.478377	1.00035	2.4792444

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT48-GB-21.6-25 ft
Sample#: B21-2143

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 15-Oct-21
Tested By: A. Eifrig

Visual Identification
Silt with Sand and Clay
Sample Color:
brown

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Certificate #: 1366.01

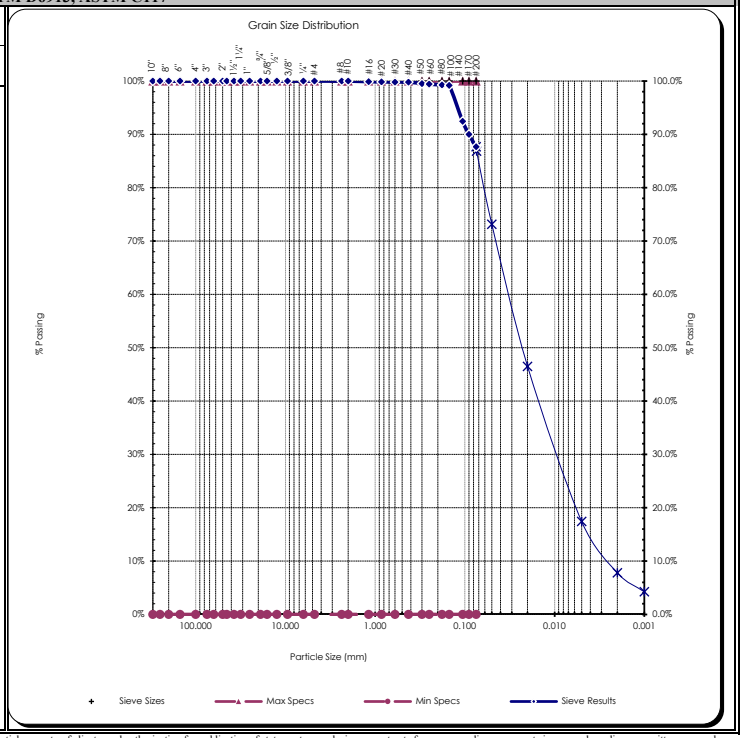
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.001	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 0.94
$D_{(10)}$ =	0.003	mm	% Sand =	12.3%	Coeff. of Uniformity, C_U = 14.64
$D_{(15)}$ =	0.004	mm	% Silt & Clay =	87.7%	Fineness Modulus = 0.02
$D_{(30)}$ =	0.010	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.023	mm	Plasticity Index =	n/a	Moisture %, as sampled = 36.9%
$D_{(60)}$ =	0.040	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.090	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	29/33		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850		100%	100.0%	0.0%
#30	0.600		100%	100.0%	0.0%
#40	0.425	100%	100%	100.0%	0.0%
#50	0.300		100%	100.0%	0.0%
#60	0.250		99%	100.0%	0.0%
#80	0.180		99%	100.0%	0.0%
#100	0.150	99%	99%	100.0%	0.0%
#140	0.106		92%	100.0%	0.0%
#170	0.090		90%	100.0%	0.0%
#200	0.075	87.7%	87.7%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	15-Oct-21
Source:	LDW21-GT48-GB-21.6-25 ft	**Tested By:**	A. Eifrig
Sample#:	B21-2143		

Visual Identification
Silt with Sand and Clay
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Sp. Gr	2.64	
Sample Weight:	50.35	grams
Hydroscopic Moist.:	2.46%	
Adj. Sample Wgt :	49.14	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	31	63.7%	0.0464 mm
2	27.5	56.5%	0.0338 mm
5	24	49.3%	0.0218 mm
15	17.5	36.0%	0.0131 mm
30	14	28.8%	0.0095 mm
60	11.5	23.6%	0.0068 mm
240	6	12.3%	0.0035 mm
1440	3	6.2%	0.0015 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	12.3%	**Plastic Limit:**	n/a
% Silt:	70.2%	**Plasticity Index:**	n/a
% Clay:	17.5%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	100%	0.850 mm
#40	100%	0.425 mm
#100	99%	0.150 mm
#200	87.7%	0.075 mm
Silts	86.8%	0.074 mm
	73.1%	0.050 mm
	46.5%	0.020 mm
Clays	17.5%	0.005 mm
	7.8%	0.002 mm
Colloids	4.2%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Silt Loam

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	15-Oct-21
Source:	LDW21-GT48-GB-21.6-25 ft	**Tested By:**	A. Eifrig
Sample #:	B21-2143		

Visual Identification
Silt with Sand and Clay
Sample Color
brown

Liquid Limit Determination

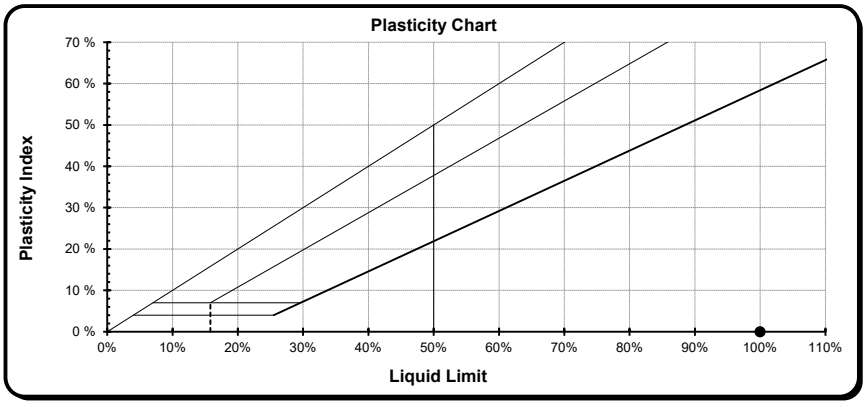
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Unable to establish liquid limit				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

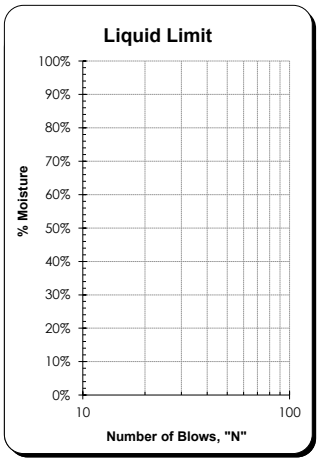
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Cannot determined plastic limit				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures, the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	15-Oct-21
Source:	LDW21-GT48-GB-25-30 ft	**Tested By:**	A. Eifrig
Sample #:	B21-2144		

Visual Identification
Silt with Sand and Clay
Sample Color
brown

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Unable to establish liquid limit				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

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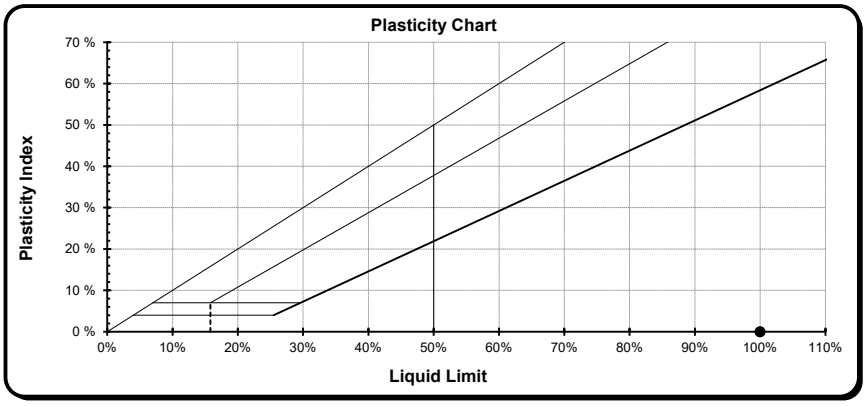
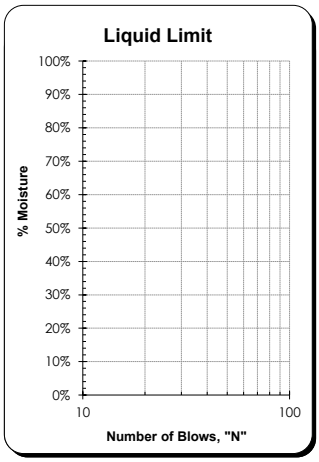
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Cannot determined plastic limit				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures, the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA, LLC	**Date Tested:**	18-Oct-21
Source:	LDW21-GT48-GB-30-35 ft	**Tested By:**	C. Kirk-Patterson
Sample #:	B21-2145		

Visual Identification
Silt with Clay
Sample Color
brown

Liquid Limit Determination

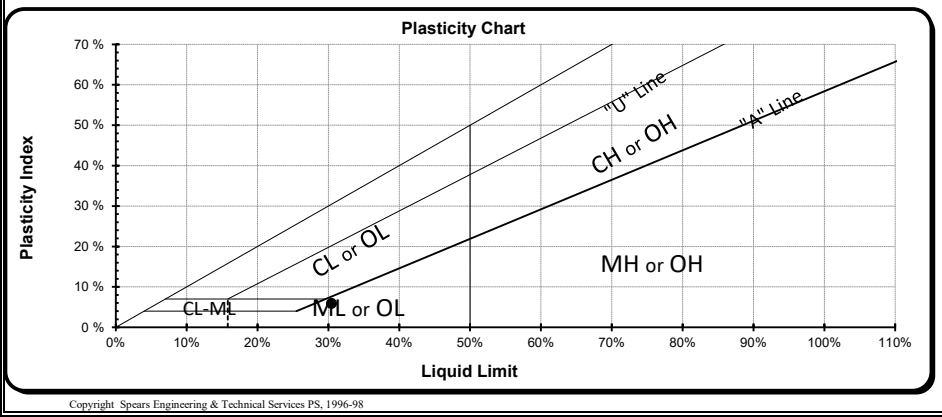
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	29.11	30.59	34.12			
Weight of Dry Soils + Pan:	25.96	26.90	30.59			
Weight of Pan:	15.19	14.77	19.81			
Weight of Dry Soils:	10.77	12.13	10.78			
Weight of Moisture:	3.15	3.69	3.53			
% Moisture:	29.3 %	30.4 %	32.8 %			
Number of Blows:	30	23	18			

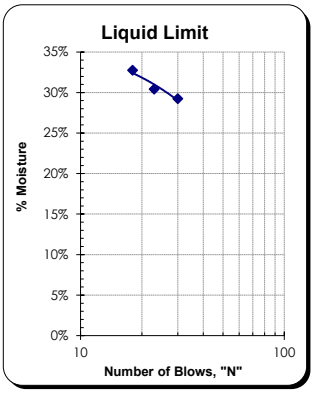
Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	34.58	35.80				
Weight of Dry Soils + Pan:	33.37	34.35				
Weight of Pan:	28.28	28.60				
Weight of Dry Soils:	5.09	5.75				
Weight of Moisture:	1.21	1.45				
% Moisture:	23.8 %	25.2 %				

Liquid Limit @ 25 Blows:	30 %
Plastic Limit:	24 %
Plasticity Index, I_P:	6 %

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Comments: _____

Reviewed by: _____
Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	15-Oct-21
Source:	LDW21-GT53-GB-0-5 ft	**Tested By:**	A. Eifrig
Sample #:	B21-2148		

Visual Identification
Silt with Clay
Sample Color
brown

Liquid Limit Determination

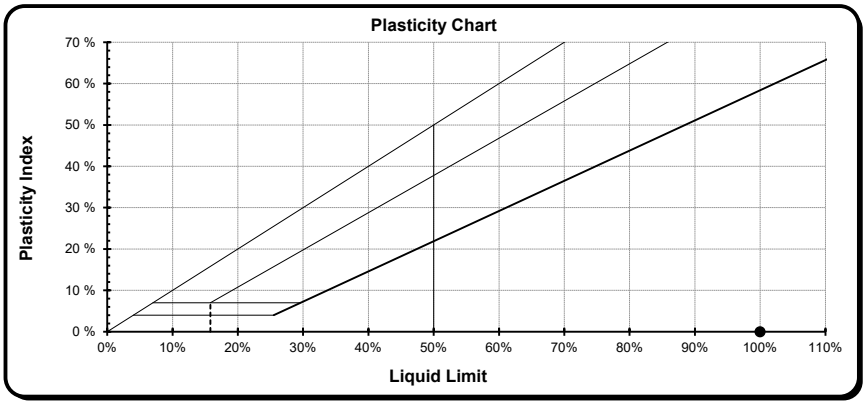
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Unable to establish liquid limit				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

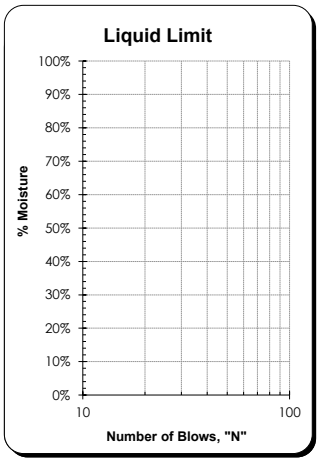
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Cannot determined plastic limit				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures, the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT53-GB-5-10 ft
Sample#: B21-2150

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 15-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

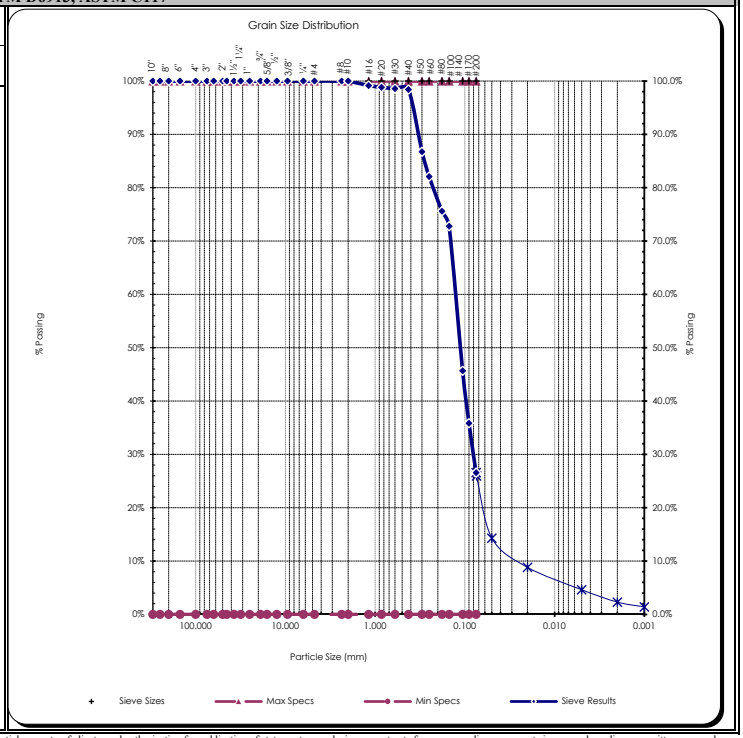
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.005	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.81
$D_{(10)}$ =	0.028	mm	% Sand =	73.4%	Coeff. of Uniformity, C_U = 4.67
$D_{(15)}$ =	0.056	mm	% Silt & Clay =	26.6%	Fineness Modulus = 0.43
$D_{(30)}$ =	0.081	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.113	mm	Plasticity Index =	n/a	Moisture %, as sampled = 45.6%
$D_{(60)}$ =	0.129	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.335	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	10/37		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	98%	98%	100.0%	0.0%
#50	0.300		87%	100.0%	0.0%
#60	0.250		82%	100.0%	0.0%
#80	0.180		76%	100.0%	0.0%
#100	0.150	73%	73%	100.0%	0.0%
#140	0.106		46%	100.0%	0.0%
#170	0.090		36%	100.0%	0.0%
#200	0.075	26.6%	26.6%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	15-Oct-21
Source:	LDW21-GT53-GB-5-10 ft	**Tested By:**	A. Eifrig
Sample#:	B21-2150		

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp. Gr	2.65	
Sample Weight:	100.03	grams
Hydroscopic Moist.:	2.23%	
Adj. Sample Wgt :	97.85	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	12	12.3%	0.0516 mm
2	11.5	11.8%	0.0368 mm
5	9	9.2%	0.0235 mm
15	8	8.2%	0.0137 mm
30	7	7.2%	0.0097 mm
60	6.5	6.6%	0.0069 mm
240	3	3.1%	0.0035 mm
1440	2	2.0%	0.0014 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	73.4%	**Plastic Limit:**	n/a
% Silt:	22.0%	**Plasticity Index:**	n/a
% Clay:	4.6%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	99%	0.850 mm
#40	98%	0.425 mm
#100	73%	0.150 mm
#200	26.6%	0.075 mm
Silts	26.0%	0.074 mm
	14.3%	0.050 mm
	8.8%	0.020 mm
Clays	4.6%	0.005 mm
	2.3%	0.002 mm
Colloids	1.4%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Loamy Sand

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

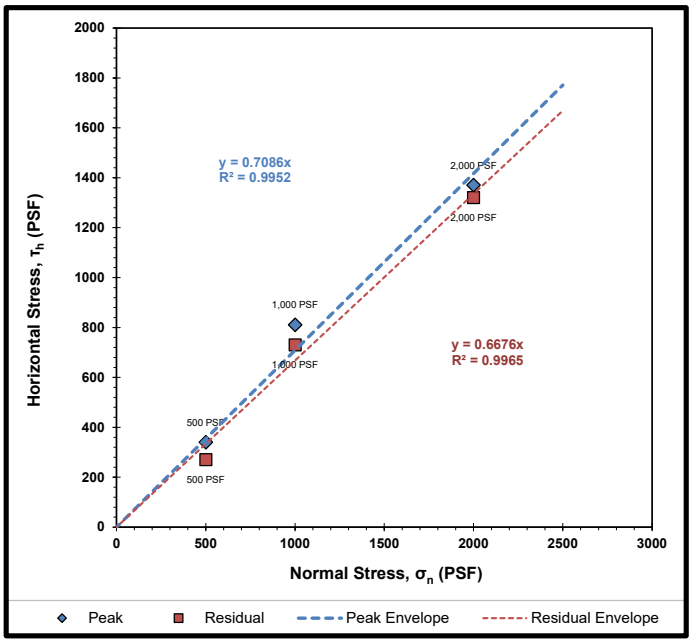
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT53-GB-5-10 ft
Laboratory Sample ID:	B21-2150	**Visual Soil Description:**	brown silty sand with gravel
Sample Date:	8/5/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	10/18/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	30.0	
	Initial	**Post-Consolidation**
Dry Density (PCF):	109.7	110.6
Void Ratio:	0.536	0.523
Porosity (%):	34.9	34.3
Degree of Saturation (%):	saturated	saturated

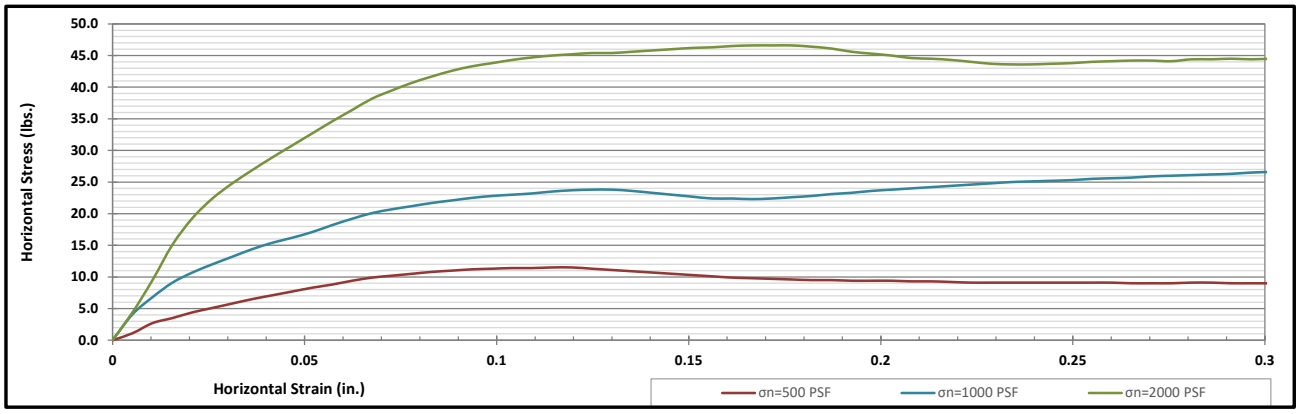
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	29.9	
	Initial	**Post-Consolidation**
Dry Density (PCF):	110.2	112.7
Void Ratio:	0.529	0.495
Porosity (%):	34.6	33.1
Degree of Saturation (%):	saturated	saturated

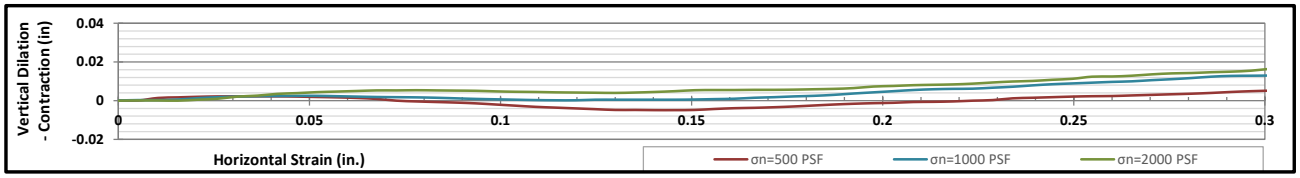
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	29.3	
	Initial	**Post-Consolidation**
Dry Density (PCF):	110.5	114.2
Void Ratio:	0.524	0.475
Porosity (%):	34.4	32.2
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**35**	**34**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	340	810	1370
Residual Horizontal Stress, τ_h (PSF):	270	730	1320





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Visit our website: www.mtc-inc.net

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT53-GB-10-15 ft
Sample#: B21-2151

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 15-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

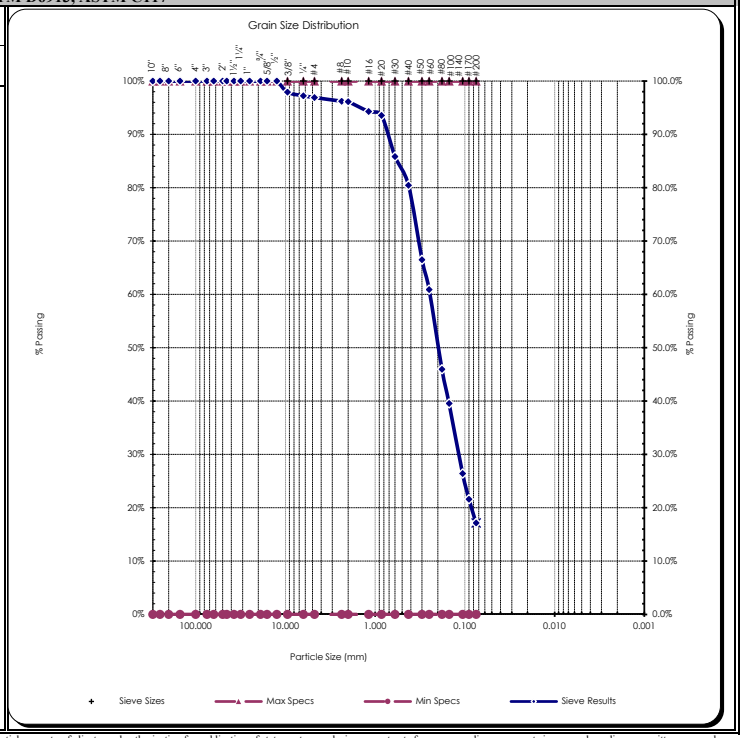
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.022	mm	% Gravel =	3.1%	Coeff. of Curvature, C_C = 1.30
$D_{(10)}$ =	0.044	mm	% Sand =	79.8%	Coeff. of Uniformity, C_U = 5.62
$D_{(15)}$ =	0.066	mm	% Silt & Clay =	17.1%	Fineness Modulus = 1.23
$D_{(30)}$ =	0.118	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.199	mm	Plasticity Index =	n/a	Moisture %, as sampled = 64.8%
$D_{(60)}$ =	0.246	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.735	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	13/61		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	98%	98%	100.0%	0.0%
1/4"	6.30		97%	100.0%	0.0%
#4	4.75	97%	97%	100.0%	0.0%
#8	2.36		96%	100.0%	0.0%
#10	2.00	96%	96%	100.0%	0.0%
#16	1.18		94%	100.0%	0.0%
#20	0.850	94%	94%	100.0%	0.0%
#30	0.600		86%	100.0%	0.0%
#40	0.425	80%	80%	100.0%	0.0%
#50	0.300		66%	100.0%	0.0%
#60	0.250	61%	61%	100.0%	0.0%
#80	0.180		46%	100.0%	0.0%
#100	0.150	40%	40%	100.0%	0.0%
#140	0.106		26%	100.0%	0.0%
#170	0.090		22%	100.0%	0.0%
#200	0.075	17.1%	17.1%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT53-GB-15-20 ft
Sample#: B21-2152

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 15-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

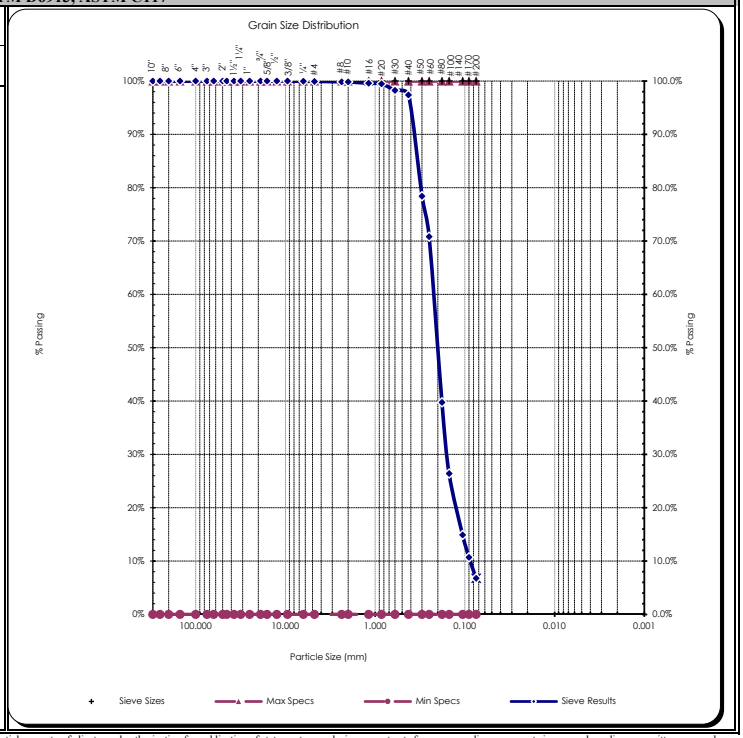
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.055	mm	% Gravel =	0.1%	Coeff. of Curvature, C_C = 1.27
$D_{(10)}$ =	0.087	mm	% Sand =	93.2%	Coeff. of Uniformity, C_U = 2.59
$D_{(15)}$ =	0.106	mm	% Silt & Clay =	6.8%	Fineness Modulus = 0.98
$D_{(30)}$ =	0.158	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.203	mm	Plasticity Index =	n/a	Moisture %, as sampled = 27.7%
$D_{(60)}$ =	0.226	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.376	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	3/43		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850	99%	99%	100.0%	0.0%
#30	0.600		98%	100.0%	0.0%
#40	0.425	97%	97%	100.0%	0.0%
#50	0.300		78%	100.0%	0.0%
#60	0.250	71%	71%	100.0%	0.0%
#80	0.180		40%	100.0%	0.0%
#100	0.150	26%	26%	100.0%	0.0%
#140	0.106		15%	100.0%	0.0%
#170	0.090		11%	100.0%	0.0%
#200	0.075	6.8%	6.8%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT53-GB-20-23.5 ft
Sample#: B21-2153

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 15-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

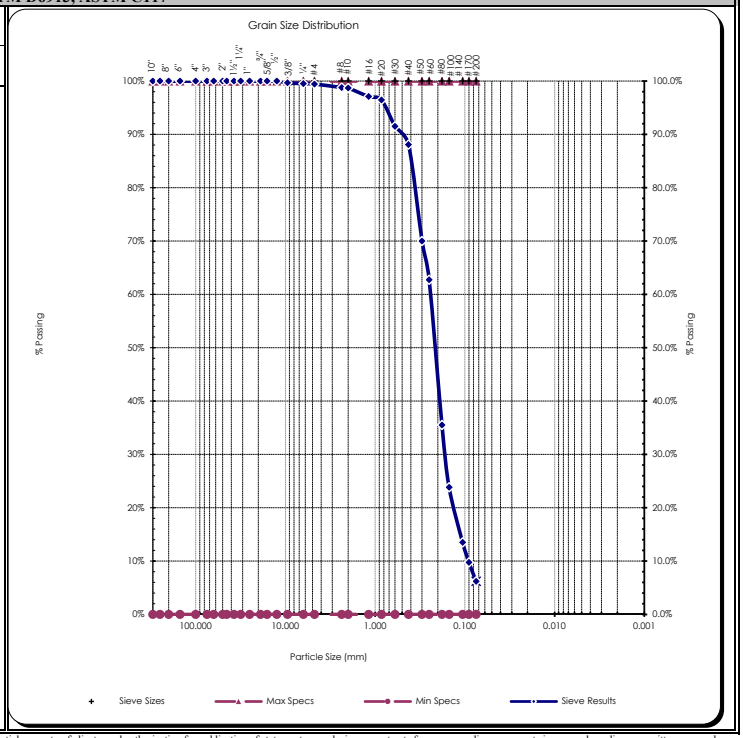
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.060	mm	% Gravel =	0.6%	Coeff. of Curvature, C_C = 1.24
$D_{(10)}$ =	0.091	mm	% Sand =	93.2%	Coeff. of Uniformity, C_U = 2.67
$D_{(15)}$ =	0.112	mm	% Silt & Clay =	6.2%	Fineness Modulus = 1.20
$D_{(30)}$ =	0.166	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.217	mm	Plasticity Index =	n/a	Moisture %, as sampled = 29.9%
$D_{(60)}$ =	0.243	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.522	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	7/99		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		97%	100.0%	0.0%
#20	0.850	96%	96%	100.0%	0.0%
#30	0.600		92%	100.0%	0.0%
#40	0.425	88%	88%	100.0%	0.0%
#50	0.300		70%	100.0%	0.0%
#60	0.250	63%	63%	100.0%	0.0%
#80	0.180		36%	100.0%	0.0%
#100	0.150	24%	24%	100.0%	0.0%
#140	0.106		14%	100.0%	0.0%
#170	0.090		10%	100.0%	0.0%
#200	0.075	6.2%	6.2%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT53-GB-23.5-25 ft
Sample#: B21-2154

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 15-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

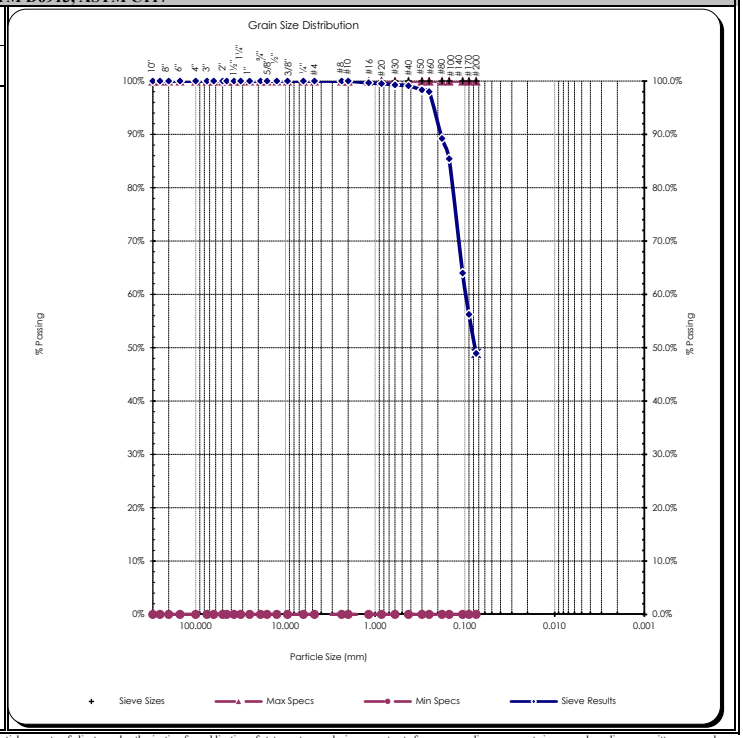
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.008	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.41
$D_{(10)}$ =	0.015	mm	% Sand =	51.1%	Coeff. of Uniformity, C_U = 6.38
$D_{(15)}$ =	0.023	mm	% Silt & Clay =	48.9%	Fineness Modulus = 0.17
$D_{(30)}$ =	0.046	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.077	mm	Plasticity Index =	n/a	Moisture %, as sampled = 33.7%
$D_{(60)}$ =	0.098	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.186	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	39/79		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850	100%	100%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		98%	100.0%	0.0%
#60	0.250	98%	98%	100.0%	0.0%
#80	0.180		89%	100.0%	0.0%
#100	0.150	85%	85%	100.0%	0.0%
#140	0.106		64%	100.0%	0.0%
#170	0.090		56%	100.0%	0.0%
#200	0.075	48.9%	48.9%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT53-GB-25-28.6 ft
Sample#: B21-2155

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 15-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

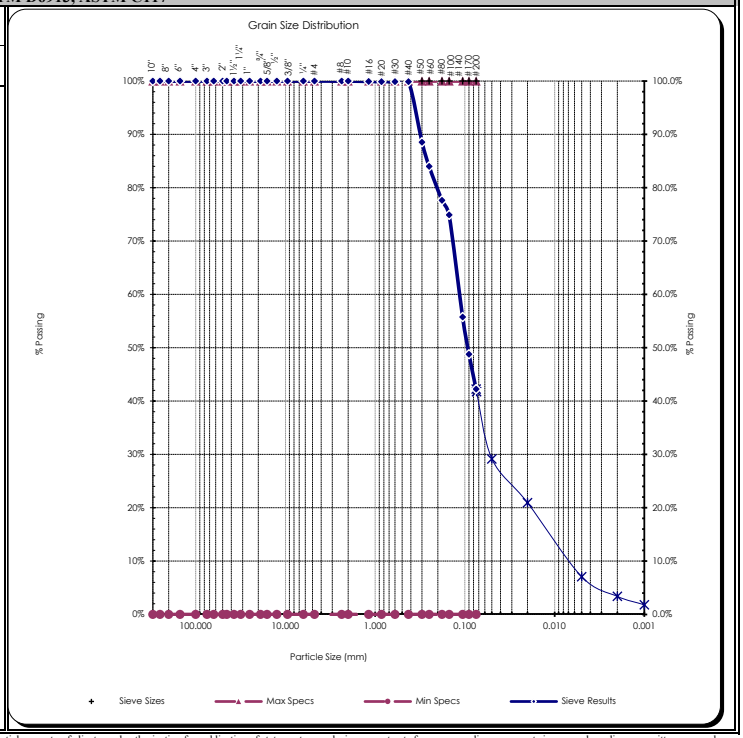
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.003	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 2.78
$D_{(10)}$ =	0.008	mm	% Sand =	57.7%	Coeff. of Uniformity, C_U = 15.33
$D_{(15)}$ =	0.013	mm	% Silt & Clay =	42.3%	Fineness Modulus = 0.37
$D_{(30)}$ =	0.049	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.093	mm	Plasticity Index =	n/a	Moisture %, as sampled = 34.9%
$D_{(60)}$ =	0.116	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.316	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	11/26		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850		100%	100.0%	0.0%
#30	0.600		100%	100.0%	0.0%
#40	0.425	100%	100%	100.0%	0.0%
#50	0.300		89%	100.0%	0.0%
#60	0.250		84%	100.0%	0.0%
#80	0.180		78%	100.0%	0.0%
#100	0.150	75%	75%	100.0%	0.0%
#140	0.106		56%	100.0%	0.0%
#170	0.090		49%	100.0%	0.0%
#200	0.075	42.3%	42.3%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	15-Oct-21
Source:	LDW21-GT53-GB-25-28.6 ft	**Tested By:**	A. Eifrig
Sample#:	B21-2155		

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Sp. Gr	2.48	
Sample Weight:	75.36	grams
Hydroscopic Moist.:	0.35%	
Adj. Sample Wgt :	75.10	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	22	30.8%	0.0519 mm
2	19	26.6%	0.0374 mm
5	17	23.8%	0.0239 mm
15	12	16.8%	0.0142 mm
30	9	12.6%	0.0102 mm
60	7	9.8%	0.0073 mm
240	4	5.6%	0.0037 mm
1440	2	2.8%	0.0015 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	57.7%	**Plastic Limit:**	n/a
% Silt:	35.2%	**Plasticity Index:**	n/a
% Clay:	7.1%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	100%	0.850 mm
#40	100%	0.425 mm
#100	75%	0.150 mm
#200	42.3%	0.075 mm
Silts	41.8%	0.074 mm
	29.2%	0.050 mm
	20.9%	0.020 mm
Clays	7.1%	0.005 mm
	3.4%	0.002 mm
Colloids	1.8%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sandy Loam

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT53-GB-28.6-30 ft
Sample#: B21-2156

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 15-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SP-SM, Poorly graded Sand with Silt
Sample Color:
grayish-brown

ACCREDITED
Certificate #: 1366.01

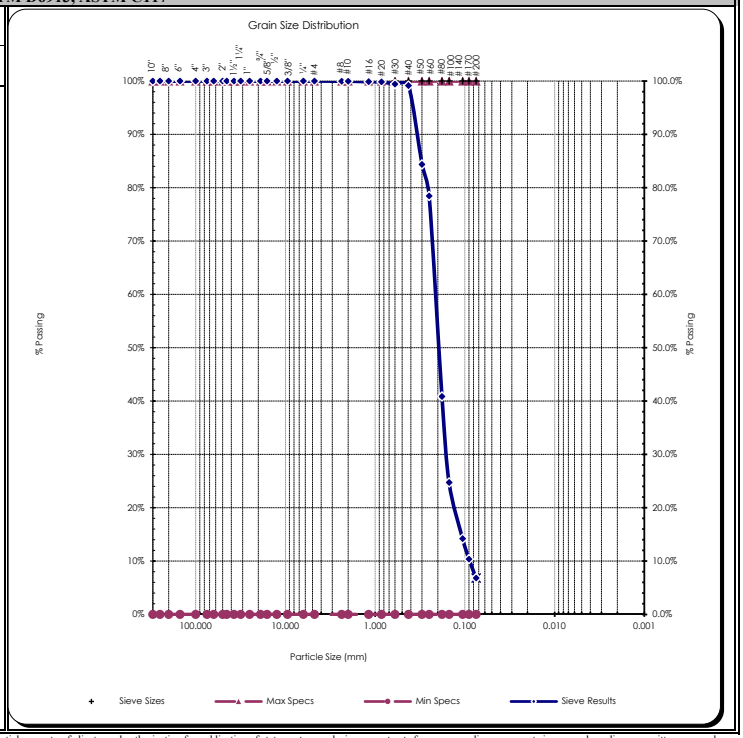
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.055	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.34
$D_{(10)}$ =	0.088	mm	% Sand =	93.2%	Coeff. of Uniformity, C_U = 2.44
$D_{(15)}$ =	0.109	mm	% Silt & Clay =	6.8%	Fineness Modulus = 0.92
$D_{(30)}$ =	0.160	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.197	mm	Plasticity Index =	n/a	Moisture %, as sampled = 22.4%
$D_{(60)}$ =	0.216	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.348	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	2/29		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850	100%	100%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		84%	100.0%	0.0%
#60	0.250	78%	78%	100.0%	0.0%
#80	0.180		41%	100.0%	0.0%
#100	0.150	25%	25%	100.0%	0.0%
#140	0.106		14%	100.0%	0.0%
#170	0.090		10%	100.0%	0.0%
#200	0.075	6.8%	6.8%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Client:	Anchor QEA	**Date:**	October 25, 2021
Address:	21328 2nd Drive SE	**Project:**	Q.C. - Lower Duwamish Waterway
	Bothell, WA 98021	**Project #:**	21B233
Attn:	Garrett Timm	**Sample #:**	B21-2164-2174
Revised on:		**Date sampled:**	8-3-21 & 8-5-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	**X**	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		**X**	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

Moisture Content - ASTM C566, ASTM D2216

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Date Received: July 29, 2021
Date Tested: October 18, 2021

Client: Anchor QEA
Sampled by: Client
Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-2164	LDW21-GT48-SPT-25-26.5 ft	233.1	1048.4	832.6	215.8	599.5	36.0%
B21-2165	LDW21-GT48-SPT-30-31.5 ft	182.3	1308.3	1004.2	304.1	821.9	37.0%
B21-2166	LDW21-GT53-SPT-10-11.5 ft	260.3	653.6	537.2	116.4	276.9	42.0%
B21-2167	LDW21-GT53-SPT-15-16.5 ft	270.1	1295.8	1089.8	206.0	819.7	25.1%
B21-2168	LDW21-GT53-SPT-20-21.5 ft	266.3	1049.6	853.9	195.7	587.6	33.3%
B21-2169	LDW21-GT53-SPT-25-26.5 ft	360.2	1271.6	1074.8	196.8	714.6	27.5%
B21-2170	LDW21-GT41-GH-0-1.3 ft	359.4	527.4	488.8	38.6	129.4	29.8%
B21-2171	LDW21-GT41-GH-1.3-2 ft	354.2	2105.6	1668.8	436.8	1314.6	33.2%
B21-2172	LWD21-GT42-GH-0-0.3 ft	341.5	409.5	366.7	42.8	25.2	169.8%
B21-2173	LWD21-GT42-GH-0.3-1.5 ft	356.9	581.1	525.1	56.0	168.2	33.3%
B21-2174	LWD21-GT42-GH-1.5-2.3 ft	224.0	439.0	407.7	31.3	183.7	17.0%

Reviewed by: 

Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Specific Gravity - ASTM D854

Project: Q.C. - Lower Duwamish Waterway
Client: Anchor QEA
Project #: 21B233
Date Received: July 29, 2021
Sampled by: Client
Date Tested: October 18, 2021
Tested by: A. Eifrig

Sample #	Location	Tare	Dry Soil + Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Density of Water @ Tx	Mass of Pycno filled w/ water & soils	Mass of Pycno filled w/ water	Temp. of Water, 0.1 *C	SpG of Soils	Temp. Correction Factor	Corrected SpG
B21-2170	LDW21-GT41-GH-0-1.3 ft	416.85	491.39	74.5	TSA-020	195.0	499.5	0.99850	738.69	693.77	18.5	2.516483	1.00030	2.5172379
B21-2174	LDW21-GT42-GH-1.5-2.3 ft	415.34	491.53	76.2	TSA-015	187.6	499.5	0.99835	733.52	686.28	19.4	2.632154	1.00014	2.6325225

Reviewed by:

Meghan Blodgett-Carrillo

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT41-GH-0-1.3 ft
Sample#: B21-2170

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 18-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

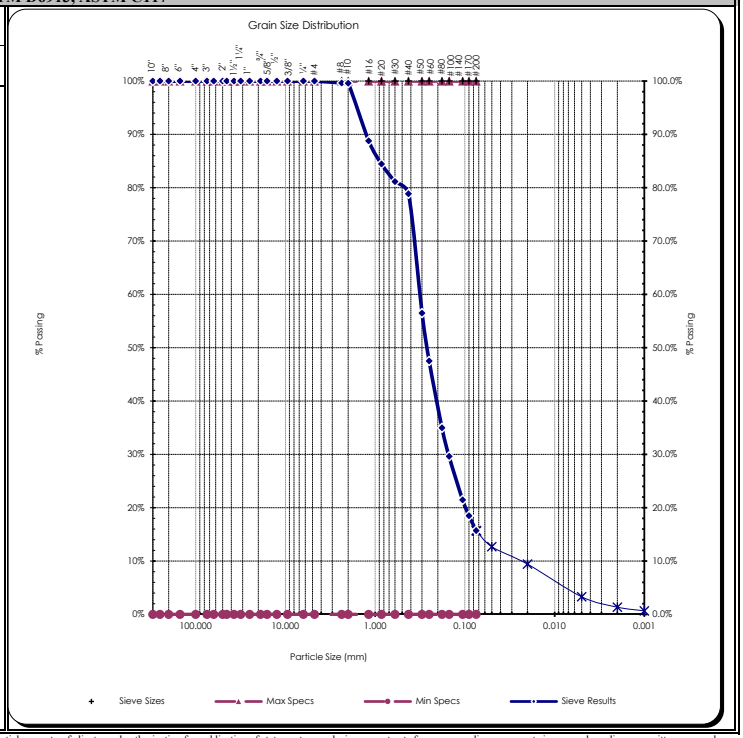
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.008	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 3.31
$D_{(10)}$ =	0.022	mm	% Sand =	84.3%	Coeff. of Uniformity, C_U = 14.63
$D_{(15)}$ =	0.068	mm	% Silt & Clay =	15.7%	Fineness Modulus = 1.44
$D_{(30)}$ =	0.152	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.264	mm	Plasticity Index =	n/a	Moisture %, as sampled = 29.8%
$D_{(60)}$ =	0.320	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.271	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	1/5		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		89%	100.0%	0.0%
#20	0.850		84%	100.0%	0.0%
#30	0.600		81%	100.0%	0.0%
#40	0.425	79%	79%	100.0%	0.0%
#50	0.300		56%	100.0%	0.0%
#60	0.250		48%	100.0%	0.0%
#80	0.180		35%	100.0%	0.0%
#100	0.150	30%	30%	100.0%	0.0%
#140	0.106		21%	100.0%	0.0%
#170	0.090		19%	100.0%	0.0%
#200	0.075	15.7%	15.7%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	18-Oct-21
Source:	LDW21-GT41-GH-0-1.3 ft	**Tested By:**	A. Eifrig
Sample#:	B21-2170		

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Sp Gr :	2.52	
Sample Weight:	100.37	grams
Hydroscopic Moist.:	0.83%	
Adj. Sample Wgt :	99.54	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	13	13.4%	0.0539 mm
2	11.5	11.9%	0.0385 mm
5	10.5	10.8%	0.0245 mm
15	7.5	7.7%	0.0144 mm
30	6.5	6.7%	0.0102 mm
60	4.5	4.6%	0.0073 mm
240	2.5	2.6%	0.0037 mm
1440	1	1.0%	0.0015 mm

% Gravel:	0.0%	**Liquid Limit:**	n/a
% Sand:	84.3%	**Plastic Limit:**	n/a
% Silt:	12.4%	**Plasticity Index:**	n/a
% Clay:	3.3%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	84%	0.850 mm
#40	79%	0.425 mm
#100	30%	0.150 mm
#200	15.7%	0.075 mm
Silts	15.6%	0.074 mm
	12.7%	0.050 mm
	9.4%	0.020 mm
Clays	3.3%	0.005 mm
	1.4%	0.002 mm
Colloids	0.7%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sand

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

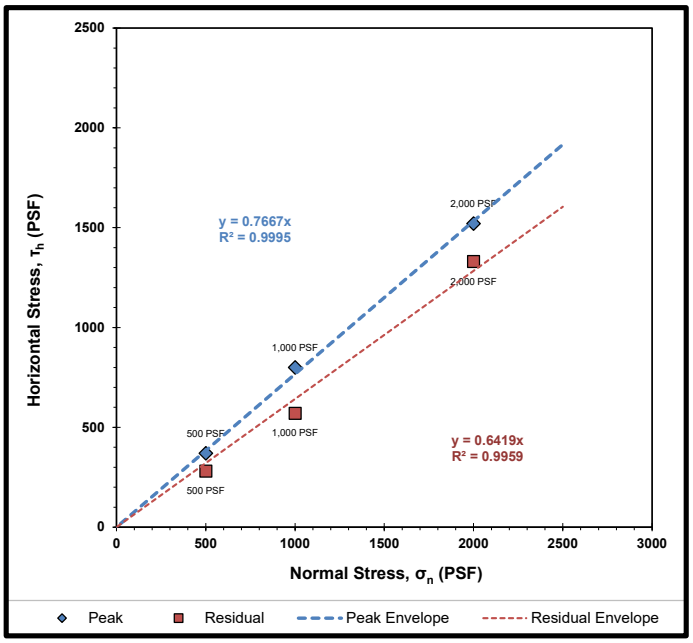
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT41-GH-0-1.3 ft
Laboratory Sample ID:	B21-2170	**Visual Soil Description:**	brown sand with silt and gravel
Sample Date:	8/3/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	10/18/2021	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0208
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	28.1	
	Initial	**Post-Consolidation**
Dry Density (PCF):	109.2	111.5
Void Ratio:	0.543	0.510
Porosity (%):	35.2	33.8
Degree of Saturation (%):	saturated	saturated

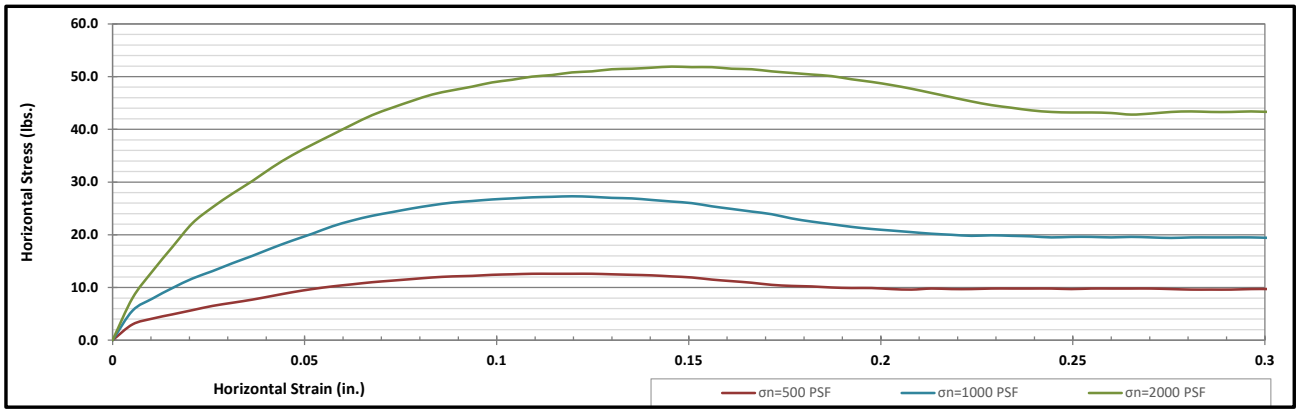
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	27.3	
	Initial	**Post-Consolidation**
Dry Density (PCF):	110.2	115.1
Void Ratio:	0.529	0.464
Porosity (%):	34.6	31.7
Degree of Saturation (%):	saturated	saturated

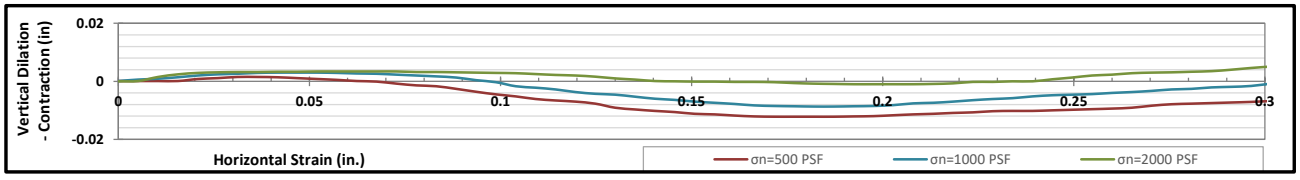
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	28.4	
	Initial	**Post-Consolidation**
Dry Density (PCF):	109.1	119.9
Void Ratio:	0.545	0.405
Porosity (%):	35.3	28.8
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**37**	**33**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	370	800	1520
Residual Horizontal Stress, τ_h (PSF):	280	570	1330





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Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT41-GH-1.3-2.0 ft
Sample#: B21-2171

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 18-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

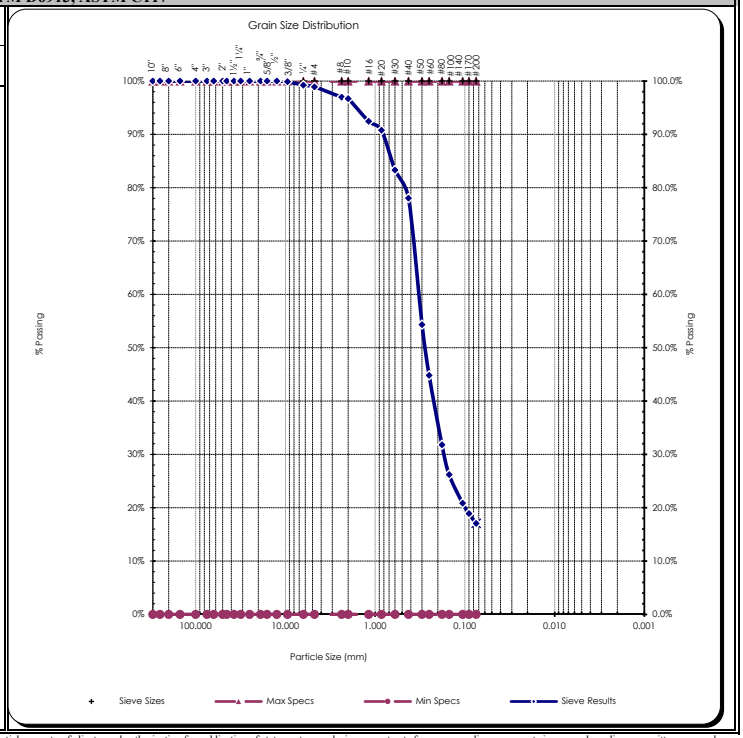
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.022	mm	% Gravel =	1.1%	Coeff. of Curvature, C_C = 2.00
$D_{(10)}$ =	0.044	mm	% Sand =	81.8%	Coeff. of Uniformity, C_U = 7.51
$D_{(15)}$ =	0.066	mm	% Silt & Clay =	17.1%	Fineness Modulus = 1.48
$D_{(30)}$ =	0.170	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.277	mm	Plasticity Index =	n/a	Moisture %, as sampled = 33.2%
$D_{(60)}$ =	0.330	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.824	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	7/32		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		97%	100.0%	0.0%
#10	2.00	97%	97%	100.0%	0.0%
#16	1.18		92%	100.0%	0.0%
#20	0.850	91%	91%	100.0%	0.0%
#30	0.600		83%	100.0%	0.0%
#40	0.425	78%	78%	100.0%	0.0%
#50	0.300		54%	100.0%	0.0%
#60	0.250	45%	45%	100.0%	0.0%
#80	0.180		32%	100.0%	0.0%
#100	0.150	26%	26%	100.0%	0.0%
#140	0.106		21%	100.0%	0.0%
#170	0.090		19%	100.0%	0.0%
#200	0.075	17.1%	17.1%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client:	Anchor QEA	**Date Tested:**	18-Oct-21
Source:	LDW21-GT42-GH-0-0.3 ft	**Tested By:**	A. Eifrig
Sample #:	B21-2172		

Visual Identification
Silt with Organics
Sample Color
brown

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Unable to establish liquid limit				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

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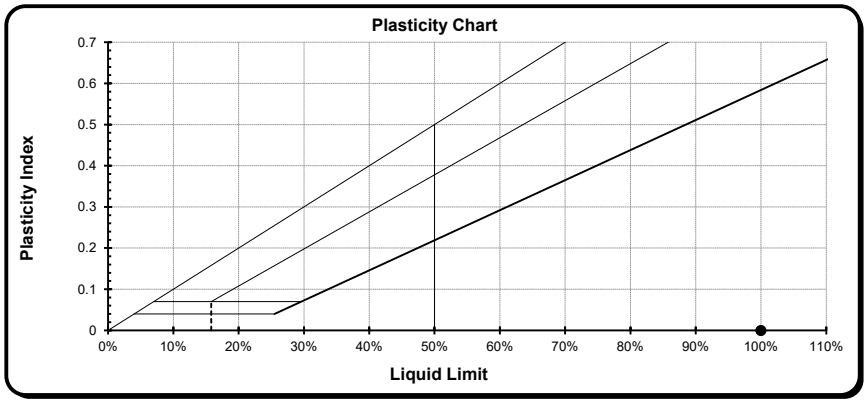
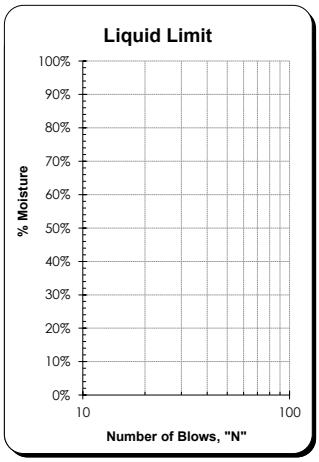
Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		Cannot determined plastic limit				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						





Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the cup without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT42-GH-0.3-1.5 ft
Sample#: B21-2173

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 18-Oct-21
Tested By: A. Eifrig

Visual Identification
Sandy Silt with Clay
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

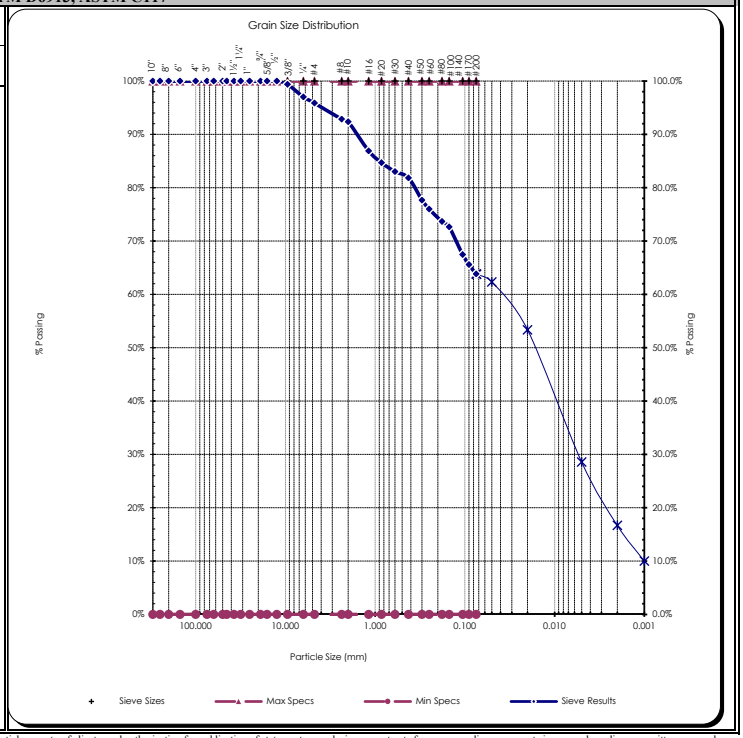
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.000	mm	% Gravel =	4.1%	Coeff. of Curvature, C_C = 0.79
$D_{(10)}$ =	0.001	mm	% Sand =	32.0%	Coeff. of Uniformity, C_U = 37.10
$D_{(15)}$ =	0.002	mm	% Silt & Clay =	63.8%	Fineness Modulus = 0.92
$D_{(30)}$ =	0.005	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.017	mm	Plasticity Index =	n/a	Moisture %, as sampled = 33.3%
$D_{(60)}$ =	0.037	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.643	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	39/50		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	99%	99%	100.0%	0.0%
1/4"	6.30		97%	100.0%	0.0%
#4	4.75	96%	96%	100.0%	0.0%
#8	2.36		93%	100.0%	0.0%
#10	2.00	92%	92%	100.0%	0.0%
#16	1.18		87%	100.0%	0.0%
#20	0.850		85%	100.0%	0.0%
#30	0.600		83%	100.0%	0.0%
#40	0.425	82%	82%	100.0%	0.0%
#50	0.300		78%	100.0%	0.0%
#60	0.250		76%	100.0%	0.0%
#80	0.180		74%	100.0%	0.0%
#100	0.150	73%	73%	100.0%	0.0%
#140	0.106		67%	100.0%	0.0%
#170	0.090		66%	100.0%	0.0%
#200	0.075	63.8%	63.8%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MATERIALS TESTING & CONSULTING, INC.

Hydrometer Report

Project:	Q.C. - Lower Duwamish Waterway	**Date Received:**	29-Jul-21
Project #:	21B233	**Sampled By:**	Client
Client :	Anchor QEA	**Date Tested:**	18-Oct-21
Source:	LDW21-GT42-GH-0.3-1.5 ft	**Tested By:**	A. Eifrig
Sample#:	B21-2173		

Visual Identification
Sandy Silt with Clay
Sample Color
brown

ASTM D7928, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	75.38	grams
Hydroscopic Moist.:	1.68%	
Adj. Sample Wgt :	74.13	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
1	49	61.1%	0.0393 mm
2	45	56.1%	0.0288 mm
5	42.5	53.0%	0.0187 mm
15	34.5	43.0%	0.0115 mm
30	30.5	38.0%	0.0084 mm
60	26	32.4%	0.0061 mm
240	18	22.4%	0.0032 mm
1440	11	13.7%	0.0014 mm

% Gravel:	4.1%	**Liquid Limit:**	n/a
% Sand:	32.0%	**Plastic Limit:**	n/a
% Silt:	35.2%	**Plasticity Index:**	n/a
% Clay:	28.6%		

ASTM D6913

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	99%	9.500 mm
1/4"	97%	6.300 mm
#4	96%	4.750 mm
#10	92%	2.000 mm
#20	85%	0.850 mm
#40	82%	0.425 mm
#100	73%	0.150 mm
#200	63.8%	0.075 mm
Silts	63.8%	0.074 mm
	62.3%	0.050 mm
	53.4%	0.020 mm
Clays	28.6%	0.005 mm
	16.7%	0.002 mm
Colloids	10.0%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Loam

Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080

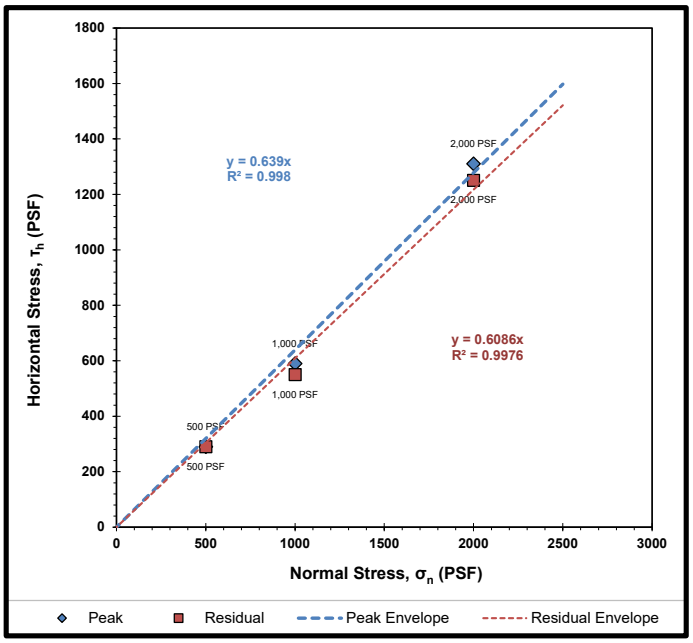
MATERIALS TESTING & CONSULTING, INC.

Project:	Q.C. - Lower Duwamish Waterway		
Project Number:	21B233	**Sample Source:**	LDW21-GT42-GH-0.3-1.5 ft
Laboratory Sample ID:	B21-2173	**Visual Soil Description:**	brown clay with silt
Sample Date:	8/3/2021	**Type of Specimen:**	Remolded Cylindrical Shear Box
Test Date:	10-19-21 through 10-21-21	**Specimen Diameter (in):**	2.5
Technician:	M. Carrillo	**Specimen Height (in):**	1
		Rate of Strain (in/min):	0.0012
		Estimated Specific Gravity of Solids:	2.65

Summary of Sample Data:		σ_n=500 PSF
Initial Moisture Content (%):	34.0	
	Initial	**Post-Consolidation**
Dry Density (PCF):	102.5	106.8
Void Ratio:	0.644	0.578
Porosity (%):	39.2	36.6
Degree of Saturation (%):	saturated	saturated

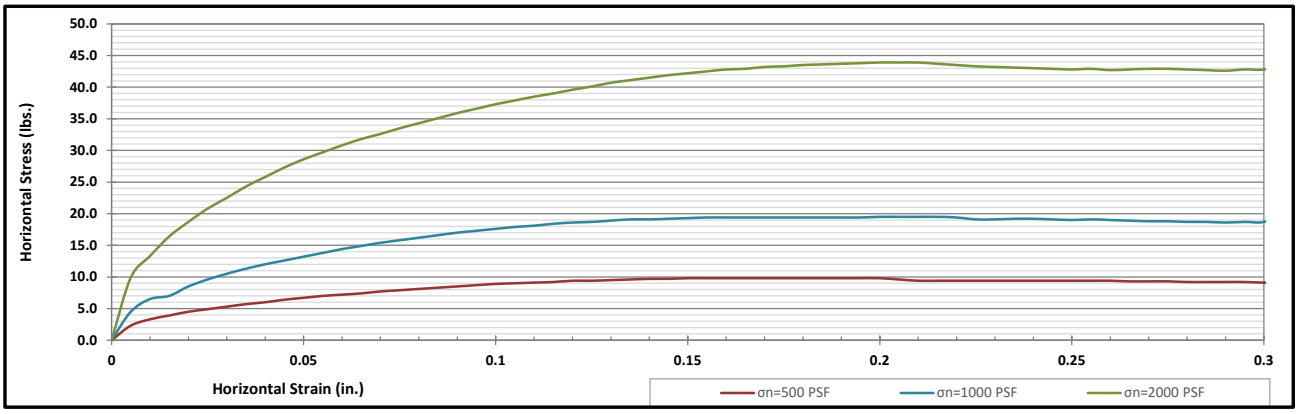
Summary of Sample Data:		σ_n=1000 PSF
Initial Moisture Content (%):	31.5	
	Initial	**Post-Consolidation**
Dry Density (PCF):	104.6	114.9
Void Ratio:	0.611	0.467
Porosity (%):	37.9	31.8
Degree of Saturation (%):	saturated	saturated

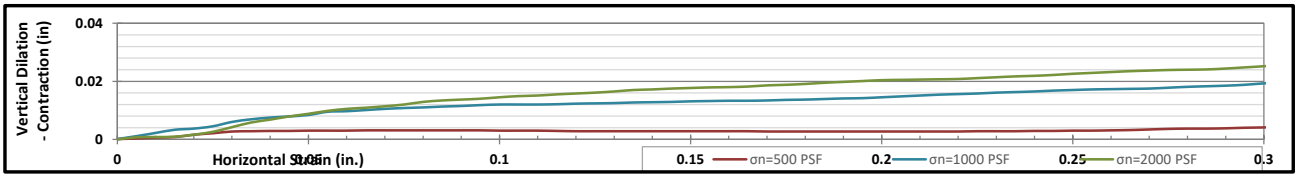
Summary of Sample Data:		σ_n=2000 PSF
Initial Moisture Content (%):	28.9	
	Initial	**Post-Consolidation**
Dry Density (PCF):	107.0	120.1
Void Ratio:	0.574	0.403
Porosity (%):	36.5	28.7
Degree of Saturation (%):	saturated	saturated



ESTIMATED STRENGTH PARAMETERS	PEAK	RESIDUAL
Angle of Internal Friction, ϕ (°):	**33**	**31**
Cohesion (PSF):	**0**	**0**

Failure Envelope Test Values:			
Normal Stress, σ_n (PSF):	500	1000	2000
Peak Horizontal Stress, τ_h (PSF):	290	590	1310
Residual Horizontal Stress, τ_h (PSF):	290	550	1250





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MATERIALS TESTING & CONSULTING, INC.

Sieve Report

Project: Q.C. - Lower Duwamish Waterway
Project #: 21B233
Client: Anchor QEA
Source: LDW21-GT42-GH-1.5-2.3 ft
Sample#: B21-2174

Date Received: 29-Jul-21
Sampled By: Client
Date Tested: 18-Oct-21
Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487
SP, Poorly graded Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

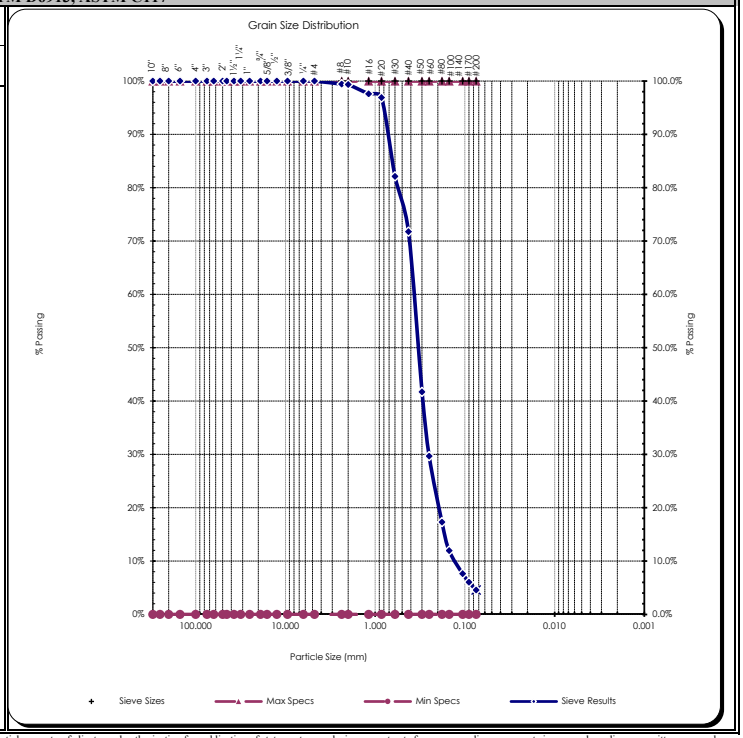
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.079	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 1.29
$D_{(10)}$ =	0.130	mm	% Sand =	95.4%	Coeff. of Uniformity, C_U = 2.90
$D_{(15)}$ =	0.167	mm	% Silt & Clay =	4.6%	Fineness Modulus = 1.67
$D_{(30)}$ =	0.251	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.334	mm	Plasticity Index =	n/a	Moisture %, as sampled = 17.0%
$D_{(60)}$ =	0.376	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.733	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	3/47		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		98%	100.0%	0.0%
#20	0.850	97%	97%	100.0%	0.0%
#30	0.600		82%	100.0%	0.0%
#40	0.425	72%	72%	100.0%	0.0%
#50	0.300		42%	100.0%	0.0%
#60	0.250	30%	30%	100.0%	0.0%
#80	0.180		17%	100.0%	0.0%
#100	0.150	12%	12%	100.0%	0.0%
#140	0.106		8%	100.0%	0.0%
#170	0.090		6%	100.0%	0.0%
#200	0.075	4.6%	4.6%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo